City of Elk Grove

Climate Action Plan

Adopted March 27, 2013

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Executive Summary

Greenhouse Gas Emissions and California

Greenhouse gas (GHG) emissions are a topic of concern. Lawmakers and elected officials across California are turning their attention to this matter. New laws such as Assembly Bill (AB) 32, Senate Bill (SB) 375, and SB 97 require local governments to address GHG emissions in their development processes and to work to achieve State-recommended GHG reduction targets. The goal of this effort is to create more sustainable communities while promoting public health, improving air quality, and responding to the potential effects of climate change.

GHG emissions include carbon dioxide (CO_2), nitrous oxide (N_2O), methane (CH_4), and various types of fluorocarbons. These gases are created from both natural processes and human activities, including driving, industrial processes, landfilling of waste, water filtration, treatment and movement, and energy production. The large-scale industrialization and urbanization of the last 100 years have increased the amount of GHG emissions in the atmosphere.

Local governments and communities can reduce GHG emissions through sustainable development patterns, waste conservation, water conservation, vehicle efficiency, alternative transportation modes, and energy efficiency.

The City of Elk Grove's Local Leadership and Sustainability Strategy

The City of Elk Grove (City) is taking proactive steps to become a more environmentally sustainable community and respond to state requirements related to GHG emissions. The City of Elk Grove Climate Action Plan (CAP or Plan) is a culmination of existing and proposed initiatives to reduce GHG emissions through goals and measures related to transportation, land use, energy use, waste, and water use. The CAP ensures that the City's future activities and development patterns conform to California state law. The CAP will also make future development easier by acting as a tiering document for GHG emissions under the California Environmental Quality Act.

Concurrently with the CAP, the City is establishing a new Sustainability Element of the General Plan. The Sustainability Element and Climate Action Plan are two separate but related components of the City's sustainability strategy.

The Sustainability Element organizes and highlights the City's goals related to sustainability and provides new direction and vision to maintain a healthy, balanced community. The CAP focuses specifically on strategies to reduce GHG emissions and provides direction to reduce emissions consistent with state law. It also builds on the goals and vision of the Sustainability Element, but translates these goals into numeric estimates of GHG reduction potential.

While the CAP is not an adopted component of the General Plan, it will be linked to the General Plan as an implementation item of the adopted Sustainability Element, which is a legally binding element of the General Plan. The Sustainability Element and Climate Action Plan Advisory Committee was created in spring 2010 to guide the City through its efforts to create the Sustainability Element and CAP and implement local and regional sustainability goals.

The CAP will build upon and incorporate related City efforts to date, such as employer-based commuter programs that serve the local workforce and reduce reliance on personal vehicles. The City has introduced a number of similar policies, programs, and development standards that enhance the local quality of life and reduce GHG emissions. All such actions are addressed and, to the extent possible, quantified in the CAP.

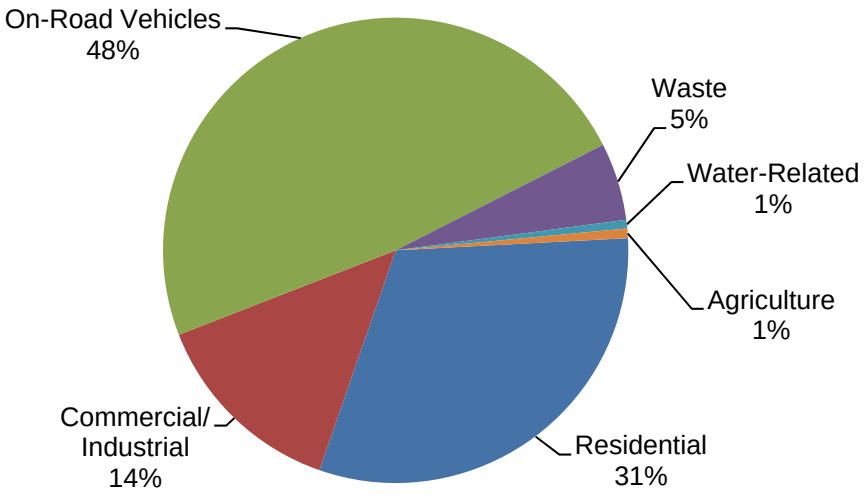
2005 Greenhouse Gas Inventory and Forecast

In June 2009, Sacramento County finalized a GHG inventory (Inventory) for each jurisdiction in Sacramento County. The Inventory calculates municipal and community-wide emissions caused by activities in 2005, including transportation, waste, water, and energy-related activities. The Inventory established a baseline against which future changes in emissions can be measured and provides an understanding of major sources of GHG emissions in the City and the region.

Staff reviewed and updated the June 2009 Inventory as part of the CAP development process. These updates incorporate new data, protocol, and best practices to ensure that the CAP is methodologically up to date.

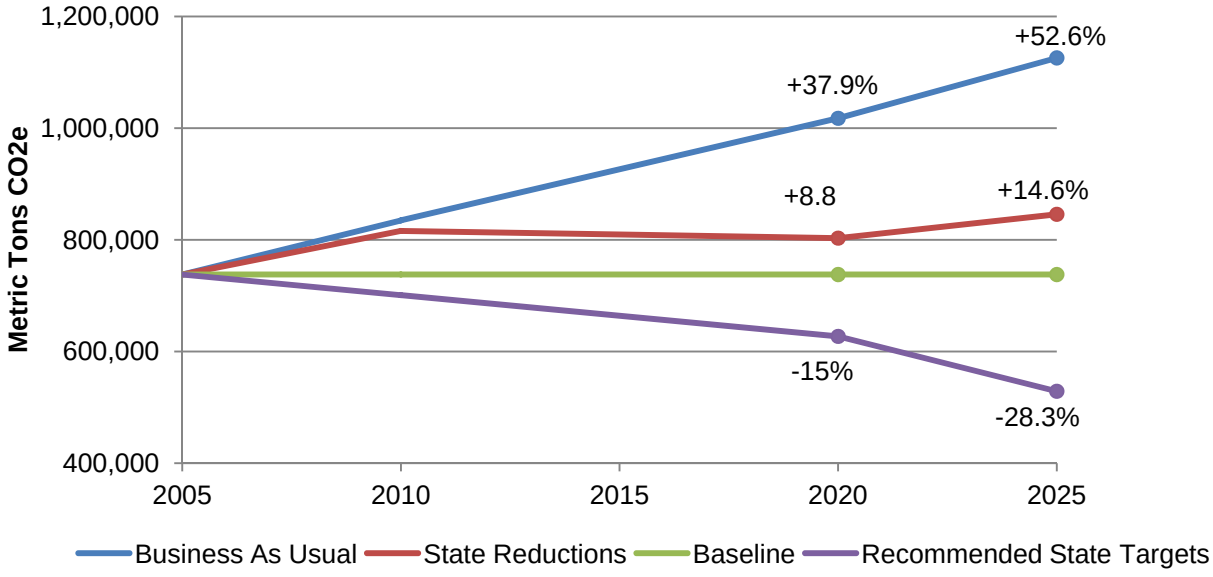
The Inventory update found that the Elk Grove community emitted 737,838 metric tons of carbon dioxide equivalent (CO_2e). CO_2e is a universal way to equalize the different potencies of the six GHG emissions in one comparable unit. Updated community-wide total emissions by sector are shown in **Figure ES-1.** On-road vehicles were by far the greatest contributor to the City's baseline emissions (48 percent). Residential and commercial energy use were the second and third largest contributors, with 31 percent and 14 percent of overall emissions, respectively.

Figure ES-1. *2005 Greenhouse Gas Emissions (CO_2e) from Community-Wide Sources*



Using data in the updated 2005 Inventory, the City created an estimate of how emissions will grow by 2020 and 2025 with Elk Grove's expected population, household, and nonresidential growth. This estimate, also known as an emissions forecast or projection, conservatively assumes that per capita consumption trends will remain the same as in 2005. The forecast is depicted in **Figure ES-2** as a blue line.

Figure ES-2. *GHG Emissions Forecast and State-Recommended Targets – 2020 and 2025*



The City then adjusted the forecast to account for state and federal actions such as mandated fuel efficiency standards, renewable electricity standards, California's new building code, and federal vehicle efficiency standards. Accounting for these actions provides a more accurate picture of future emissions growth and the responsibility and ability of local governments versus the state to reduce GHG emissions. The State-adjusted forecast is shown in **Figure ES-2** as a red line**.** The figure also shows the State-recommended reduction target of 15 percent below 2005 levels by 2020, and reductions continuing through 2025, showing consistency with the Governor's Executive Order S-03-05 to reduce emissions by an additional 80 percent by 2050. The objective of this Plan is to bridge the gap between the City's growth forecast and the state's recommended reduction targets.

Attainment of Reduction Targets

In the General Plan Sustainability Element, the City establishes a policy to reduce GHG emissions within the community by a minimum of 15 percent below 2005 levels by 2020. This will require significant action at the local, regional, and state level. The CAP outlines the City's strategies to achieve these reduction targets locally and consolidates local actions with regional and state strategies in one plan to analyze their effectiveness in reducing Elk Grove's GHG emissions. This approach recognizes the importance of large-scale coordination and confronts the fact that many

important reduction strategies are almost entirely out of the hands of the local government and dependent on state action.

Elk Grove's local actions to reduce emissions in this CAP fall into four policy topics: an Innovative and Efficient Built Environment, Resource Conservation, Transportation Alternatives and Congestion Management, and Municipal Programs.

Total reductions in emissions are summarized below in **Table ES-1**.

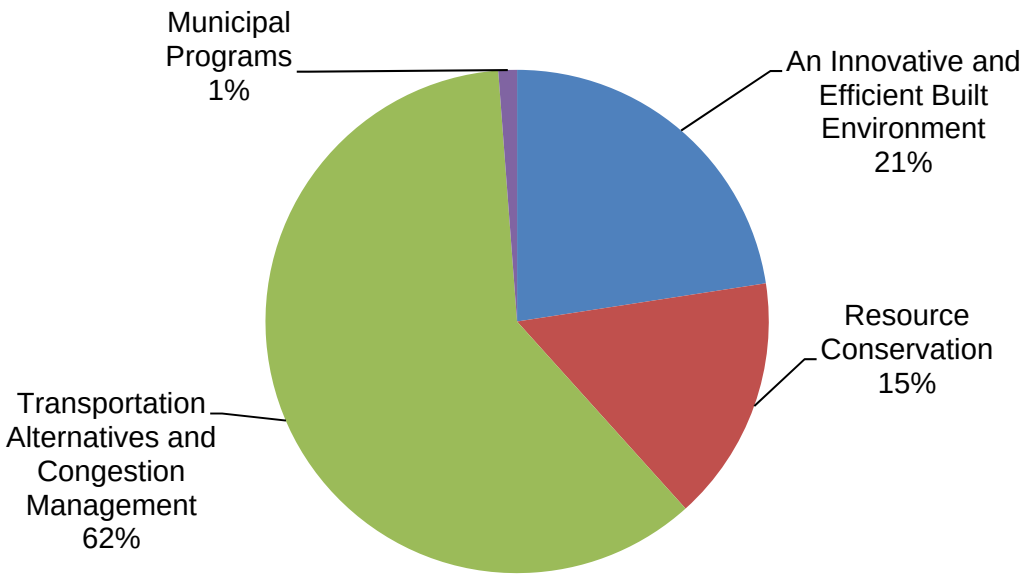
Table ES-1. *GHG Reductions by Policy Topic*

Policy Topic	2010 GHG	2020 GHG	2025 GHG
An Innovative and Efficient Built Environment	-217	-37,240	-52,199
Resource Conservation	-2,162	-28,221	-31,304
Transportation Alternatives and Congestion Management	-29,904	-108,221	-129,166
Municipal Programs	-94	-2,149	-3,604
Total Reductions	-32,377	-175,831	-216,273
Emissions Forecast	**816,001**	**802,959**	**845,612**
Net Emissions with CAP Reductions	**783,624**	**627,128**	**629,339**
Percentage Change from 2005 Levels (737,838 $MTCO_2e$/yr)	**6.21%**	**-15.00%**	**-14.70%**

Implementation of each CAP measure, in combination with the state actions, will allow the City to achieve a 15.00 percent reduction by 2020. Due to higher forecast rates of growth in emissions sectors between 2020 and 2025, the forecast emissions reduction by 2025 drops slightly to 14.70 percent below baseline by 2025. Further, the City's 2020 reduction achievement is consistent with AB 32 targets; therefore, implementation of the goals and measures would be consistent with the State's 2020 goal for local governments. **Figure ES-3** depicts the percentage of reduction for each policy topic for the 2020 target year. It is important to note that these reductions depict only actions to be implemented at the local level; they assume implementation of State-led and State-induced

actions (including the Sacramento Municipal Utility District Renewables Portfolio Standard).

Figure ES-3. *2020 Reductions by Policy Topic ($MTCO_2e$)*


Municipal Programs 1%
An Innovative and Efficient Built Environment 21%
Resource Conservation 15%
Transportation Alternatives and Congestion Management 62%

The City's 2025 reduction achievement of 14.70 percent does not follow a trajectory toward the State's 2050 reduction target of 80 percent below 1990 levels by 2020. However, it demonstrates ongoing progress and the City's commitment to work toward sustained, long-term reductions. It is likely that the City's actual 2025 reduction achievement will surpass that which can be calculated at this time due to technical innovations and developments to state policy.

Next Steps

To achieve these reductions, the City must take concerted action. While the type of action required for success is a natural extension of the City's existing activities and priorities, the CAP nonetheless necessitates that the City go above and beyond its normal practice. The Plan outlines recommended responsibilities for implementation of each measure and provides cost estimates.

This CAP is being completed concurrently with and will be integrated into the City's Sustainability Element. The new Sustainability Element will reference this Plan for actions to implement reductions in GHGs. Because it is a separate document from the General Plan, the CAP can be updated on a regular basis, ensuring that the General Plan and Elk Grove's climate efforts are always up to date. Regular updates and modifications to this Plan will be required to respond to new emerging knowledge, statewide regulations, policies, and best practices for reducing GHG emissions. Maintaining this flexibility in the CAP will be critical to its ultimate success.

Achievement of the reductions established in this CAP requires timely implementation complemented with the initiative of each resident, employee, and business in Elk Grove. This coordinated and comprehensive approach will help the City protect the earth and the local community for generations to come and ensure that Elk Grove is positioned to excel in spite of anticipated challenges resulting from GHG emissions.

A Climate Action Plan Readers' Guide

The following guide to the CAP's structure will help readers to easily locate the sections of greatest interest and importance to them.

1. Introduction. In this chapter, the reader is introduced to the general purpose and mechanics of the CAP. Further, the chapter provides background on sustainability efforts and public outreach that informed the CAP. This chapter also identifies the City's commitment to ongoing monitoring of CAP implementation progress.

2. Background. In this chapter, the CAP is placed within the context of overall GHG science and regulation. The chapter concludes with an explanation of the relationship of the CAP to the Sustainability Element and General Plan.

3. Greenhouse Gas Emissions Inventory and Forecast. This chapter provides the primary, big-picture results of the CAP, summarizing the foundation for the CAP and success of the Plan at achieving its reduction targets.

4. Reduction Strategy. This chapter details all actions that will be implemented in the City to reduce GHG emissions; it elucidates the basis for the reductions summarized in Chapter 3. The chapter includes strategies to reduce emissions from both municipal and community-wide sources. Key highlights for this chapter include:

Emissions targeted for City action. This section presents local actions to reduce GHG emissions.

Simplified presentation of each policy topic. This section groups individual reduction strategies into four policy topics: an Innovative and Efficient Built Environment, Resource Conservation, Transportation Alternatives and Congestion Management, and Municipal Programs.

The total reductions by policy topic and sector are summarized at the beginning of the section.

Subsequently, the GHG reduction potential and implementation information is presented in a table.

5. Conclusion and Next Steps. Chapter 5 provides a set of strategies to ensure that CAP policies will be continuously implemented, integrated, and updated.

6. Glossary. This is a list of terms used throughout the document.

7. Works Cited. This section includes all citations from the body of the report and excludes citations that are included in either of the appendices.

Appendix A. This appendix presents a simplified version of the GHG inventory peer review and update, in addition to a description of the methodology used to account for state actions in the forecast.

Appendix B. This section presents the assumptions and reductions in GHG emissions for each reduction measure that was accounted for in Chapter 4.

Introduction

This climate action plan demonstrates the City of Elk Grove's commitment to reducing greenhouse gas (GHG) emissions consistent with state legislation. The City will reduce GHG emissions caused by City operations and facilitate reductions in the community through the goals, measures, and actions identified herein. These efforts will not only reduce emissions, but create a healthier, more sustainable Elk Grove.

Purpose and Scope

Local governments play an important role in reducing greenhouse gas (GHG) emissions. While state and federal governments retain control of the "big hitters" such as vehicle efficiency, fuel efficiency, and renewable power, local governments have influence over other, more local influences to GHG emissions such as land use, transit, recycling, water conservation, and more. In addition, these efforts have co-benefits such as lower energy bills, improved air quality, economic growth, reduced emissions, and an enhanced quality of life.

In December 2009, the City was awarded an Energy Efficiency and Conservation Block Grant (EECBG) from the United States Department of Energy (DOE). The City dedicated a portion of its EECBG funds to prepare this Climate Action Plan together with a General Plan Sustainability Element. The Climate Action Plan was adopted by the City Council on March 27, 2013.

The Elk Grove Climate Action Plan (CAP) is the beginning of an ongoing planning process that enables the City to comply with state legislation related to GHG emissions. The purpose of this Plan is to identify how the City will achieve the state-recommended GHG emission reduction target of 15 percent by the year 2020 and to create a path to obtain 2050 State targets associated with Governor's Order S-03-05. The CAP provides goals and associated measures, also referred to as GHG reduction measures, in the sectors of energy use, transportation, land use, water, and solid waste.

Specifically, this Plan:

- Identifies sources of greenhouse gas emissions from sources within the City of Elk Grove's jurisdictional/political boundary and estimates how these emissions may change over time.
- Discusses the various outcomes of reduction efforts and how these reduction efforts can be implemented and advertised.
- Provides energy use, transportation, land use, water use, and solid waste strategies to reduce Elk Grove's greenhouse gas emissions levels to 15 percent below 2005 levels by 2020.
- Provides methods for reducing Elk Grove's greenhouse gas emissions consistent with the direction of the State of California

through the Global Warming Solutions Act (AB 32), Governor's Order S-03-05, and Public Resources Code Section 21083.05. [The California Environmental Quality Act (CEQA) Guidelines encourage the adoption of policies or programs as a means of addressing comprehensively the cumulative impacts of projects. See State CEQA Guidelines, Chapter 3 of Division 6 of Title 14 of the California Code of Regulations, § 15064, subd. (h)(3), § 15130, subd. (d).]

- Provides substantial evidence that the emissions reductions estimated in the Climate Action Plan are feasible.

Relationship to the General Plan

The CAP is linked to the General Plan through the General Plan Sustainability Element. The Sustainability Element and Climate Action Plan are two separate but related components of the City's sustainability strategy. The Sustainability Element organizes and highlights the City's goals related to sustainability and provides new direction and vision to maintain a healthy, balanced community. The CAP focuses specifically on strategies to reduce greenhouse gas (GHG) emissions and provides direction to reduce emissions consistent with state law and the CEQA Guidelines. The CAP is a tool that allows the City to look at its impact on GHG emissions, establish goals for GHG emissions reductions, and create steps to achieve these reduction targets. The CAP builds on the goals and vision of the Sustainability Element, but translates these goals into numeric thresholds and targets for GHG emissions. The CAP will be linked to the General Plan as a stand-alone policy and implementation item coordinated with the adopted Sustainability Element, a legally binding element of the General Plan.

This CAP is intended to be an adaptively managed document with the flexibility to change and be modified as the science and regulatory framework is further refined in coming years. It is recommended that the CAP be reviewed every five years to ensure the most appropriate information and emission reduction measures are included in the Plan.

This CAP encompasses the current and future efforts to reduce greenhouse gas emissions. By incorporating the goals and measures of this CAP into the General Plan, Elk Grove is ensuring that future development and planning activities within the City conform to the objectives of the CAP and state legislation.

This CAP will be an integral part of planning and development in Elk Grove in the coming years. As illustrated in **Figure 1-1**, the CAP serves as an analytical link for the City between local development, state requirements, and regional efforts. It will also be a way for the City to determine consistency with state legislation, such as AB 32, SB 375, and SB 97, which mandate that local governments address greenhouse gas emissions in local planning and environmental documents.

Figure 1-1. *Context of the CAP in Relation to Other Planning Documents and Legislation*

Relationship to the California Environmental Quality Act

This CAP is structured to serve as a programmatic tiering document for the purposes of CEQA. A tiering document front-loads the analysis needed for many projects in order to decrease the time and money that would be needed for individual analyses per project.

While this CAP identifies numerous mandatory and voluntary measures, the City will ensure appropriate use of the CAP for CEQA streamlining by maintaining the prerogative to use both mandatory and voluntary measures as standards for new development, as appropriate. The City will work with applicants on a project-by-project basis to determine appropriate use of the CEQA benefits of the CAP, identifying appropriate measures to integrate into project design or mitigation. For projects seeking to use CEQA streamlining provisions, the City may require voluntary measures in this CAP as mandatory conditions of approval or mitigation in a mitigated negative declaration or an environmental impact report, as appropriate, on a project-by-project basis. This approach allows the City to ensure that new development can benefit from CEQA streamlining while also ensuring that the City is on target to achieve the reduction targets outlined in this Plan.

Public Involvement in the CAP Development Process

Public engagement is integral to creating a document that is reflective of community-specific needs. Engaging community members early in order to identify ways the City and community can reduce greenhouse gas emissions will lead to more successful implementation of these programs and projects in the future.

Public Workshop One. The City held an initial public workshop on the concepts of sustainability, seeking input from the community on prioritization of concepts and ideas, and providing education about the City's existing programs and policies related to sustainability. Participants learned about the City's new sustainability initiatives and provided feedback on the community vision for a sustainable Elk Grove.

Participants engaged in a facilitated discussion about what a sustainable Elk Grove looks like, what the challenges are to achieving this vision, and the strategies that the City and community can employ to achieve their vision of local sustainability.

They identified the following characteristics in their vision of a "Sustainable Elk Grove":

- Low carbon transportation and development
- Low carbon innovative buildings
- Resource stewardship
- Cultural and lifestyle diversity
- A healthy community and culture
- A healthy natural environment
- A robust green economy

Workshop participants also noted challenges to achieving this vision, including lack of money, concerns over special interests, lack of public awareness and education, existing regulations, pollution, and urban sprawl. Participants were also asked to identify possible solutions to addressing these challenges. Some of the key strategies identified by participants included:

- Outreach and education programs
- User fees
- A focus on livable growth, using best practices, green buildings, and other methods for livable growth
- Regional and governmental partnerships
- A commitment by business to the community

These results provided the City with valuable insight into what the Elk Grove community envisions for a sustainable future.

Public Workshop Two. A second public workshop was held after the release of the public draft Sustainability Element and Climate Action Plan. The purpose of this workshop was to:

- Provide opportunities to learn about the Draft Climate Action Plan and Draft General Plan Sustainability Element; and
- Receive direction from the community regarding the prioritization of the actions contained in the CAP and Sustainability Element.

Following a presentation by staff, workshop participants were invited to participate in a prioritization activity and to provide any other feedback on the actions and policies proposed for inclusion in the CAP and Sustainability Element.

Overall, the results from the prioritization exercise show significant support, from meeting participants, for the implementation of CAP and Sustainability Element actions in the short term (0–3 years).

Additional comments provided to staff were focused on the need to incentivize change, to account for the cost of new programs, and to clarify the potential for sustainability requirements to change over time. A complete record of participant comments is maintained as part of the administrative record of this project.

Sustainability Element and Climate Action Plan Advisory Committee

The City created the Sustainability Element and Climate Action Plan (SECAP) Advisory Committee to guide sustainability initiatives within the community. The committee's role is to inform the creation of the Climate Action Plan and Sustainability Element while also working to implement local and regional sustainability goals. The committee is responsible for providing feedback and comments on the Climate Action Plan and Sustainability Element, helping to reflect the community's desired direction for these documents. The following members were selected from the community to serve on the SECAP Advisory Committee:

- Thomas Campbell
- Lyndon Hawkins
- Jimmie Johnson
- Bob Lilly
- Bill Myers
- Susan Oto
- Craig Sarmento

The SECAP Advisory Committee met four times throughout the planning process. Each meeting focused on a specific element of each document, for example, Sustainability Element policies or CAP reduction measures. During each meeting, SECAP committee members provided feedback on suggested policy language, helping to identify gaps, proposing new policies and programs for Elk Grove, and ensuring the documents address community concerns and priorities.

Implementation

Implementation of the CAP, in coordination with the Sustainability Element, will help Elk Grove to become an environmentally sustainable community while complying with state requirements to reduce GHG emissions 15 percent below baseline levels by 2020. To facilitate timely implementation of the CAP, each reduction measure identifies the department or agency responsible for implementation and provides public and/or private cost estimates. As outlined in Chapter 5, the City has also committed to conduct annual monitoring and reporting on progress of CAP implementation. The City will also develop additional implementation tools to help staff integrate the CAP into ongoing planning activities, including a monitoring and reporting tool and a development compliance checklist.

Background

An Overview of Climate Change

Awareness of climate change, greenhouse gas emissions, and global warming has increased significantly in recent years. Although used interchangeably, there is a difference between the terms "climate change" and "global warming." According to the National Academy of Sciences, climate change refers to any significant, measurable change of climate lasting for an extended period. Global warming, on the other hand, is an average increase in the temperature of the atmosphere caused by increased greenhouse gas emissions. The use of the term climate change is becoming more prevalent because it encompasses all changes to the climate, not just temperature.

Climate change scientists are not certain how climate change will affect the planet over time. Although much of the attention to the topic is global in scale, it is important to realize that climate change affects every community at the local level and that there are changes that can be made to mitigate anticipated effects.

To fully understand climate change, it is important to recognize the naturally occurring "greenhouse effect" and to define the greenhouse gases (GHG) that contribute to this phenomenon.

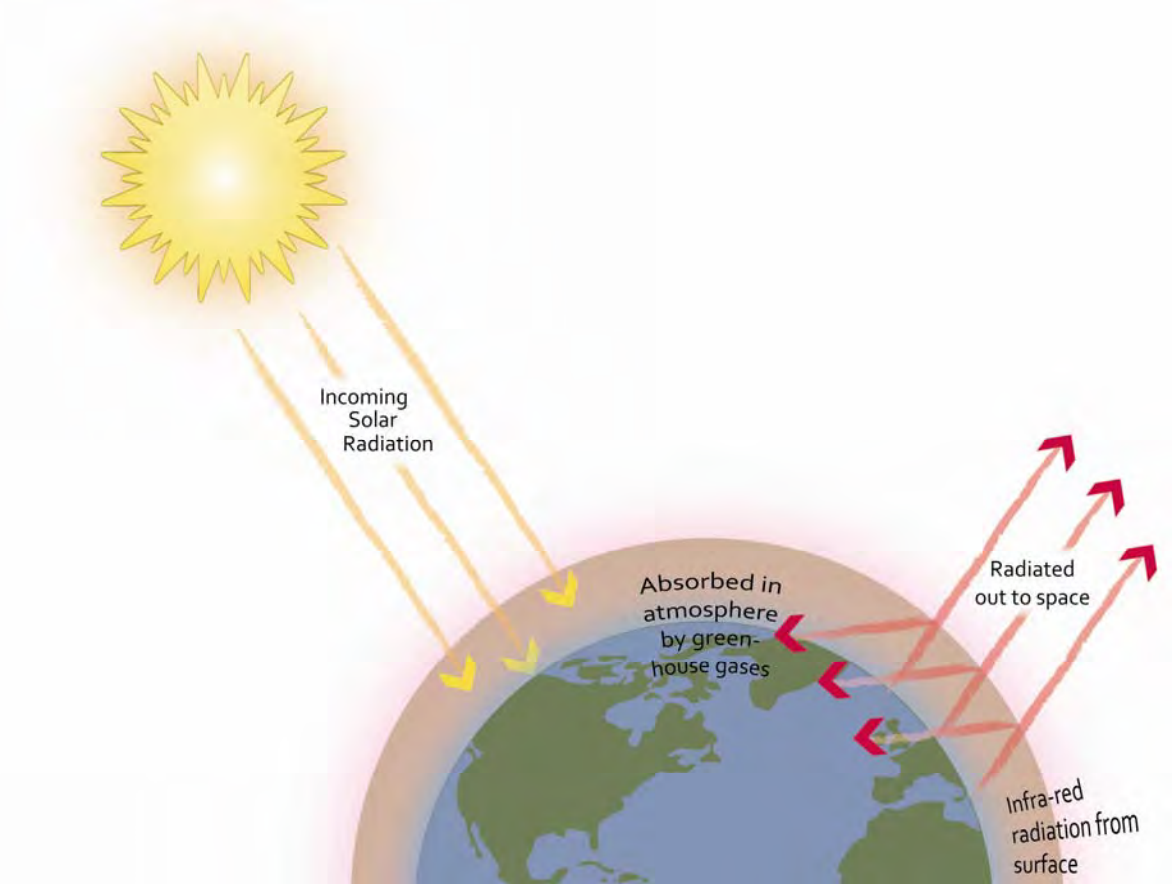
Our planet relies on the natural greenhouse effect. This effect results when the atmosphere captures heat that radiates away from the earth toward space. By retaining heat and warming the planet's surface, life on earth is possible. Several gases in the atmosphere function as barriers and trap heat within the planet's atmosphere, including water vapor, carbon dioxide, methane, nitrous oxides, and chlorofluorocarbons. These gases function similarly to glass on a greenhouse; the glass panes of a greenhouse allow sunlight to pass into the building but trap heat within it, preventing heat from escaping.[1] (Refer to **Figure 2-1.**)

Greenhouse gases are transparent to certain wavelengths of the sun's radiant energy, allowing them to penetrate deep into the atmosphere or all the way to the earth's surface. Clouds, ice caps, and particles in the air reflect about 30 percent of this radiation, but oceans and land masses absorb the rest (70 percent of the radiation received from the sun) before releasing it back toward space as infrared radiation. Greenhouse gases and clouds effectively prevent some of the infrared radiation from escaping; they trap the heat near the earth's surface where it warms the lower atmosphere. If this natural barrier of atmospheric gases were not present, the heat would escape into space and the earth's average global temperatures could be as much as 61 degrees Fahrenheit cooler.[2]

[1] NASA 2009.

[2] NASA 2009.

Figure 2-1. *The Greenhouse Gas Effect*



While the greenhouse effect is a natural process, human activities have accelerated the generation of greenhouse gas emissions beyond natural levels. This overabundance of greenhouse gases has led to an unexpected warming of the earth, which has the potential to severely impact the earth's climate system.

How Are Greenhouse Gases Measured?

"Carbon dioxide equivalent" (CO_2e) is a way to equalize the different potencies of the six internationally recognized greenhouse gases (carbon dioxide, methane, nitrous oxides, hydrofluorocarbons, perfluorocarbons, and sulfur hexafluoride). For example, methane (CH_4) has 21 times the potency of carbon dioxide (CO_2); therefore, 21 metric tons CO_2e could be 21 metric tons of carbon dioxide or 1 metric ton of methane.

Climate Change Impacts

GLOBAL IMPACTS

The Intergovernmental Panel on Climate Change's (IPCC) Fourth Assessment Report's Working Group I Summary for Policymakers synthesizes current scientific understanding of global climate change and projects future climate change using the most comprehensive set of established global climate models.[3] The report incorporates findings of the current effects of global climate change. These findings include an increase in tropical cyclone (hurricane) intensity, a loss in seasonally frozen ground in the Northern Hemisphere, and an increase in drought intensity since the 1970s.

As asserted in the IPCC Fourth Assessment Report, if trends remain unchanged, continued GHG emissions at or above current rates will induce further warming changes in the global climate system that will exceed trends observed to date and pose even greater risks than those currently witnessed.[4]

Given the scientific basis of basic climate change facts and expected trends, the challenge remains to prepare for and mitigate climate change through deliberate global and local action.

The IPCC and Climate Change Science

What does the IPCC do? The role of the Intergovernmental Panel on Climate Change (IPCC) is to transparently and objectively assess the scientific, technical, and socioeconomic information relevant to understanding the scientific basis of risk of human-induced climate change, its potential impacts, and options for adaptation and mitigation.

Why is the IPCC's work important? Work produced by the IPCC has become the "international gold standard in scientific assessments of climate change," reflecting the most current state of knowledge about the field.

Who contributes to IPCC work? IPCC reports are constructed through the work of thousands of unpaid scientists from leading research institutions, universities, and scientific organizations; the members of the IPCC (the world's national governments); and the IPCC's elected leadership.[5]

Adaptation or mitigation alone cannot avoid all of the anticipated impacts of climate change, but in coordination, these two strategies can complement each other and reduce climate change risks.[6] The burden to implement these strategies falls to governments. However, this burden also creates tremendous opportunity—acting on these strategies yields both mitigation and economic benefits.

[3] IPCC 2007.

[4] IPCC 2007.

[5] IPCC 2010a, b, c.

[6] Ibid.

STATE AND LOCAL IMPACTS

Research suggests that California will experience hotter and drier conditions, reductions in winter snow and increases in winter rains, sea level rise, and an increased occurrence of extreme weather events. Such compounded impacts will affect economic systems throughout the state. To refrain from action is costly and risky; the California Climate Adaptation Strategy estimates that no action to address the potential impacts of climate change will lead to sector-wide losses of " 'tens of billions of dollars per year in direct costs' and 'expose trillions of dollars of assets to collateral risk.' "[7]

The City of Elk Grove continues to study hydrology patterns, water quality issues, land use, native species, and many other sectors that could be affected by climate change. While it is difficult to predict exactly how climate change will affect these community-specific issues, it is important to be aware of the general risks and implement mitigation strategies according to local needs.

INCREASED RATE OF WILDFIRES

Wildfire risk is based on a combination of factors including precipitation, winds, temperature, and vegetation. Wildfires are likely to grow in number and size throughout the state as a result of increased temperatures induced by climate change. Even under the "medium" warming scenario predicted by the Intergovernmental Panel on Climate Change, wildfire risk will likely increase by 55 percent in California.[8] Further, as wildfires increase in frequency and size, they will also increase in intensity.[9]

NEGATIVE IMPACTS ON WILDLIFE

As temperatures rise, species are moving north in California or to higher elevations. This change in migration disrupts the food chain and prevents some plant species from being pollinated. Water and food supplies are expected to be more variable and to shift as the seasons change on different time frames. Further, those species that are unable to migrate face the danger of extinction: "The amount of future warming expected in California may likely exceed the tolerance of endemic species (i.e., those that are native to a specific location and that only occur there) given their limited distribution and microclimate."[10]

With vegetation, reduction in soil moisture will result in early dieback of many plants, potentially leading to conflicts with animal breeding seasons and other natural processes. Many of the potential effects on wildlife are still being studied, but due to an inability to adapt to new climates, the potential for severe species loss is present.

[7] California Natural Resources Agency 2009.

[8] California Climate Change Center 2006.

[9] California Natural Resources Agency 2009.

[10] California Natural Resources Agency 2009.

Several potential hydrological changes associated with global climate change could also specifically influence the ecology of aquatic life in California and have several negative effects on cold-water fish. For example, if a rise in air temperature by just a few degrees Celsius occurs, this change could be enough to raise the water temperatures above the tolerance of salmon and trout in many streams, favoring instead non-native fishes such as sunfish and carp. Unsuitable summer temperatures would be particularly problematic for many of the threatened and endangered fish that spend summers in cold-water streams, either as adults or juveniles or both.

DETERIORATING PUBLIC HEALTH

Heat waves are expected to have a major impact on public health, as well as decreasing air quality and increasing mosquito breeding and mosquito-borne diseases. Further, climate change is expected to alter the spread and prevalence of disease vectors, in addition to leading to a possible decrease in food quality and security.[11] Vector control districts throughout the state are already evaluating how they will address the expected changes to California's climate.

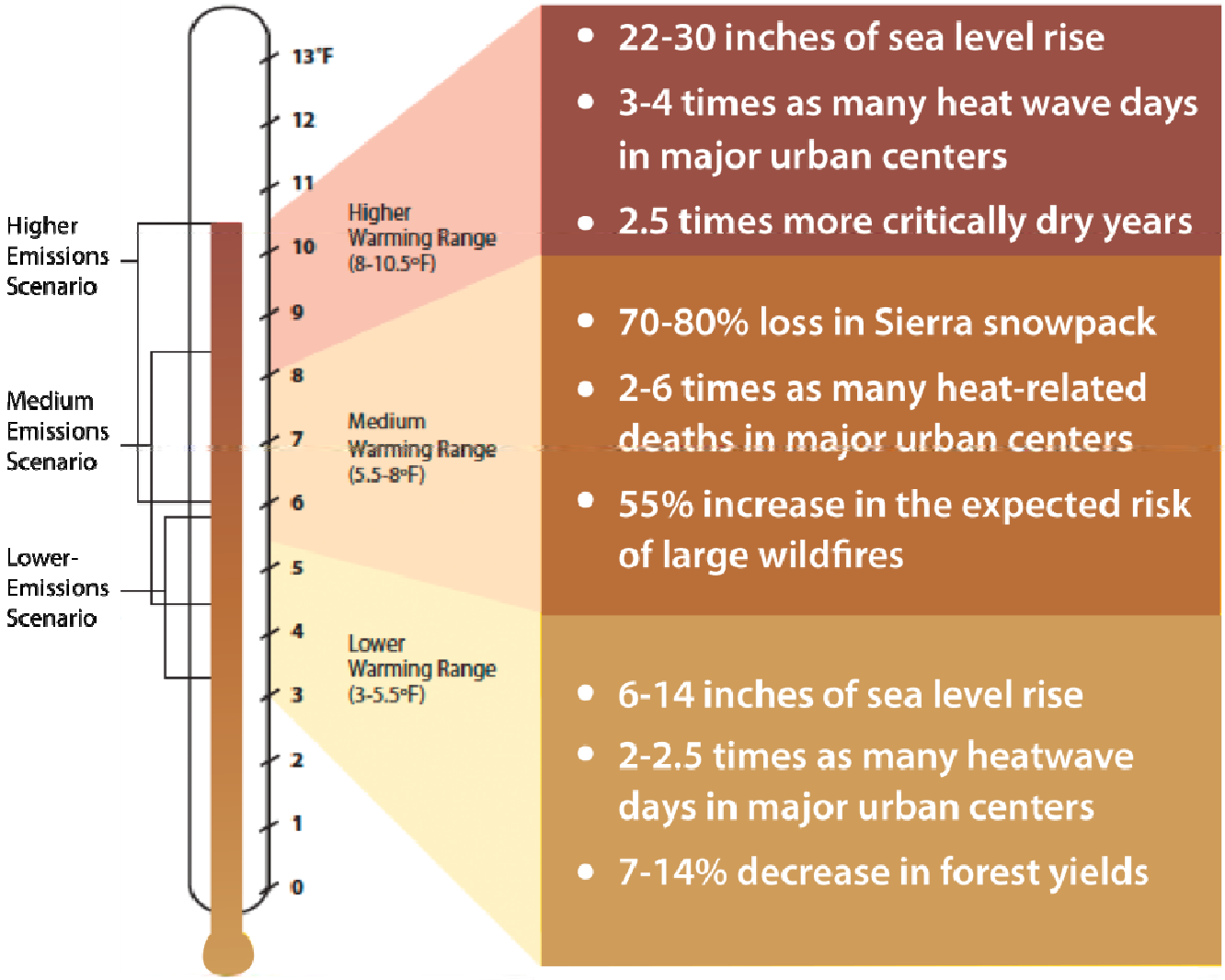
According to a new report from the Air Resources Board, the warming climate will increase ozone levels in California's major air basins, leading to upwards of 6 to 30 more days per year with ozone concentrations that exceed federal clean-air standards.

Taking cost-effective measures to reduce greenhouse gas emissions and protect public health is important for local governments. The new study provides evidence of what is becoming known as the "climate penalty," where rising temperatures increase ground-level ozone and airborne health-damaging particles, despite the reductions achieved by programs targeting smog-forming emissions from cars, trucks, and industrial sources.[12] The elderly, young, and vulnerable populations most likely to be impacted by climate change are also those that often lack sufficient resources to adapt. Such vulnerable demographics are likely to need assistance to respond to climate change. Social equity issues related to the unequal distribution of resources and increased costs to address community-wide health risks will need to be addressed proactively to reduce the potential for financial strain on local governments.

[11] Ibid.

[12] Ibid.

Figure 2-2. *California Climate Change Impacts*[13]



[13] California Department of Water Resources 2008.

A DECREASING SUPPLY OF FRESH WATER

The state's water supply is already under stress and is anticipated to shrink under even the most conservative climate change scenario. Warmer average global temperatures cause more rainfall than snowfall, making the winter snowfall season shorter and accelerating the rate at which the snowpacks melt in the spring. The Sierra snow-pack is estimated to experience a 25 to 40 per-cent reduction from its average by 2050.[14] With rain and snow events becoming less predictable and more variable, the rate of flooding could increase and California's ability to store and transport fresh water for consumption could decrease. Further, warmer weather will lead to longer growing seasons and increased agricultural demand for water.[15]

INCREASED SEVERITY AND FREQUENCY OF FLOOD EVENTS

Forecasts indicate more intense rainfall events, generating more frequent or extensive runoff, and flooding may result from a changing climate. Localized flood events may increase in periods of heavy rain. As explained by the Climate Adaptation Strategy, California's water system is structured and operated to balance between water storage for dry months and flood protection during rainy seasons.[16] Although climate change is likely to lead to a drier climate overall, risks from regular, more intense rainfall events can generate more frequent and/or more severe flooding that upsets this managed balance between storage and protection. Several areas in Elk Grove have been determined by the Federal Emergency Management Agency (FEMA) to fall within 500- and 100-year floodplains.[17] Areas within the floodplains will likely be more vulnerable to the heightened flooding threats that are anticipated to result from climate change. Additionally, erosion may increase and water quality may decrease as a result of increased rainfall amounts.

State and Federal Regulatory Framework

The State of California's elected officials have taken an aggressive stance on reducing greenhouse gas emissions. The State has developed a framework of legislation that provides a method for local and state governments to address climate change. The framework is described below.

[14] Department of Water Resources 2008.

[15] California Natural Resources Agency 2009.

[16] California Natural Resources Agency 2009.

[17] City of Elk Grove 2003.

CALIFORNIA'S LEGISLATIVE DIRECTION

The State of California is the 15th largest emitter in the world of greenhouse gas emissions, ultimately accounting for 2 percent of global emissions.[18] However, the State has been working proactively to reduce emissions. California has a long history of proven leadership in addressing these issues that spans the last 20 years. In 1988, Assembly Bill (AB) 4420 (Sher, Chapter 1506, Statutes of 1988) designated the California Energy Commission (CEC) as the lead agency for GHG issues in California.[19] Since that time, there has been a flurry of initiatives in California, with the majority of legislation passed between 2000 and now. These initiatives have strengthened the ability of entities in California to engage in accurate data collection and have created ambitious targets and regulations that will directly lead to reductions in greenhouse gas (GHG) emissions. Not only have California's efforts earned it a role as the leader in the United States for climate planning strategies, but the state has received world attention and accolades for its efforts.

A Brief History of California's Landmark Climate Change Legislation and Actions

1988 – AB 4420 (Sher Chapter 1506, Statutes of 1988): Designates the California Energy Commission (CEC) as the lead agency for climate change issues in California

2000 – SB 1771 (Sher, Chapter 1018, Statutes of 2000): Creation of the California Climate Action Registry (CCAR), a nonprofit entity established to assist entities in California working to create GHG emissions baseline inventories.

2001 – SB 527: Directed the CEC to provide specific guidance to the CCAR on issues including the development of GHG emissions protocols and the qualifications of third parties providing technical assistance and certification of inventories.

2002 – AB 1493 (Pavley, Chapter 200, Statutes of 2002): Directed CARB to create regulations that would lead to reductions in greenhouse gas emissions from passenger vehicles, light-duty trucks, and noncommercial vehicles sold in California.

[18] California Air Resources Board, CCAR, and ICLEI 2008.

[19] California Energy Commission 2009.

2005 – EO S-3-05: Establishes progressive greenhouse gas emissions reduction targets for the state:

- By 2010, reduce greenhouse gas emissions to 2000 levels;
- By 2020 reduce greenhouse gas emissions to 1990 levels;
- By 2050, reduce greenhouse gas emissions to 80 percent below 1990 levels.

2006 – AB 32: Known as the California Global Warming Solutions Act, the law requires the California Air Resources Board to develop regulatory and market mechanisms that will reduce greenhouse gas emissions to 1990 levels by 2020.

2006 – SB 1368 (Perata, Chapter 598, Statutes of 2006): Established greenhouse gas emission performance standards for longer-term financial investments in base-load electricity generation to catalyze the transition to cleaner energy use.

2008 – SB 97 (Dutton, Chapter 185, Statutes of 2008): Clarified responsibilities for analyzing GHG emissions per the California Environmental Quality Act (CEQA).

2008 – AB 32 Scoping Plan: CARB approves the AB 32 Scoping Plan outlining regulatory and market mechanisms to achieve the goal of AB32. The plan cites local government action as an integral partner to achieving the State's goals.

2008 – SB 375: Aims to reduce GHG emissions by linking transportation funding to land use planning. It requires Metropolitan Planning Organizations (MPOs) to create Sustainable Communities Strategies (SCSs) in their regional transportation plans (RTPs) for the purpose of reducing urban sprawl. Compliance is encouraged with new CEQA streamlining provisions and an allowance for an extended Regional Housing Needs Allocation (RHNA) cycle when assessments are coordinated with the regional transportation planning process.

2010 – State Resources Agency adopts guidelines developed by the Governor's Office of Planning and Research (OPR) to address climate change in CEQA documents, per SB 97. Guidelines Section 15183.5(b) outlines the approach to structuring plans for reduction GHG emissions to serve as tiering documents.

FEDERAL DIRECTION

The federal government has yet to enact legislative targets for GHG emissions reductions. However, numerous proposals are under way at the federal level to limit emissions from power plants, impose pricing on carbon emissions, and provide federal energy legislation. In 2011, the federal government announced a proposal to enact stronger national fuel economy and greenhouse gas pollution standards for 2017–2025 vehicle model years, increasing fuel economy to 54.5 miles per gallon for cars and light-duty trucks by model year 2025. The federal government also previously granted California

with authority to implement groundbreaking vehicle efficiency standards in 2009. However, with the release of the national fuel economy standards, the California Air Resources Board committed to collaborate with the United States Environmental Protection Agency and the Department of Transportation to jointly coordinate the development of regulations. In addition, the federal government has addressed GHG emissions though the approval of the American Reinvestment and Recovery Act (ARRA), also referred to as the federal stimulus package. Through the Energy Efficiency and Conservation Block Grant (EECBG) program, a division of ARRA, the US Department of Energy (DOE) is providing a total of $3.2 billion to cities and counties to reduce fossil fuel emissions; reduce total energy use; improve energy efficiency in the transportation, building, and other appropriate sectors; and create and retain jobs.[20] Using this money, jurisdictions across the United States are allocating funds to achieve reductions in greenhouse gas emissions.

Existing Sustainability Efforts in Elk Grove

The City has implemented ambitious and innovative policies, programs, and development standards that enhance the local quality of life and reduce GHG emissions. All such actions are addressed and, to the extent possible, integrated into the Climate Action Plan. This approach gives the City credit for all GHG emissions reductions that have resulted since the baseline inventory. All reductions achieved to date are depicted in this Plan as progress toward GHG emissions reduction targets. Below are examples of current sustainability initiatives—both public and private. These initiatives provide an important foundation for the vision established in the Sustainability Element and the actions proposed in this Plan.

- **Energy.** The City is in the process of subgranting EECBG funds to the Sacramento Regional Energy Alliance (the Alliance) for energy efficiency education, energy surveys, rebates, and financing programs that will help to promote and ease the cost of undertaking energy efficiency and renewable energy projects in businesses and homes. Further, adopted policies encourage energy efficiency conservation features in new development.
- **Land Use.** The City strives for a balance of local land uses that will reduce the need to utilize personal vehicles for all aspects of daily living. The Elk Grove Economic Development Corporation (EGEDC) and Shop Elk Grove program promote local economic activity, encouraging the localization of employment and recreational shopping. Programs and policies also promote affordable, mixed-use, and multi-family development that is integrated into the community.
- **Transportation.** The City's workforce is served by multiple commuting programs. Options include the paratransit E-Van and E-Tran, in addition to the Sacramento Region

[20] US Department of Energy 2010.

Commuter Club and resources provided by local employer-based Employee Transportation Coordinators. An Intelligent Transportation System (ITS) is currently being implemented with stimulus funds that will enhance transportation flow and reduce emissions. The City has also actively encouraged the use of alternative transit. The City has completed numerous bus stop improvements and is working to install new bus shelters citywide. The City is also using stimulus funds to upgrade E-Tran buses to compressed natural gas (CNG) vehicles. Bicycle and pedestrian travel is facilitated through improvement programs as directed by the Bicycle and Pedestrian Master Plan, adopted in 2004, and the Trails Master Plan, adopted in 2007.

- **Waste Reduction.** Numerous programs facilitate recycling and reduce landfilled waste, including curbside e-waste pickup, curbside recycling, a restaurant waste program, and a proposed Business Recycling Ordinance. The City also hosted a successful composting workshop for local residents as well as other education programs.
- **Water Conservation.** The Elk Grove Water Service (EGWS) provides rebates for clothes washers and toilets that conserve water. In partnership with the Sacramento Municipal Utilities District (SMUD), the EGWS also provides free mulch that reduces moisture evaporation in outdoor landscaping.

This CAP incorporates these efforts to date and builds a framework for what more can be done between now and 2025.

Greenhouse Gas Emissions Inventory & Forecast

An inventory of greenhouse gas emissions is an important first step in the climate action planning process. It identifies major sources of greenhouse gas emissions and provides a baseline against which progress can be measured.

2005 Greenhouse Gas Emissions Inventory Background

In June 2009, the Sacramento County Department of Environmental Review and Assessment completed a greenhouse gas (GHG) emissions inventory (Inventory) of each jurisdiction in the county. The Inventory calculated GHG emissions produced from government operations and community-wide activities in 2005.

The Inventory consists of two distinct inventories: 1) the inventory of emissions from government operations, and 2) the inventory of emissions caused by community-wide activities. The government, or municipal, operations inventory is a subset of the community-wide inventory. Emissions from the government operations inventory mostly take place within the community of Elk Grove, meaning that all government operations are included in the nonresidential, transportation, waste, and other sectors of the community-wide inventory.

The Inventory used the baseline year of 2005 because of the availability of reliable data and also to maintain consistency with California's Assembly Bill (AB) 32 and other agencies throughout the state. The Inventory is an important first step for the City to create a baseline against which it can measure future progress. The largest GHG emitters and opportunities for reduction are revealed through the Inventory, making it an integral component of the City's sustainability efforts.

It should be noted that GHG emissions inventorying is not an exact science. There is no standard protocol for community-wide inventories, and the protocol for calculating the GHG impact of City government operations is continually being improved by the State. There are sources of GHG emissions (e.g., refrigerants and water reservoirs) that scientists know contribute to GHGs but are difficult or impossible to calculate at the local level. Furthermore, it is likely that new sources of GHG will be able to be assessed in the future and that our way of calculating present emissions will change drastically as technology and science develop. Elk Grove's Inventory should therefore be viewed as a study to inform policy decisions rather than as a scientific measurement of GHGs.

Greenhouse Gas Emissions Inventory Update

PURPOSE OF THE UPDATE

In June 2009, the Sacramento County Department of Environmental Review and Assessment completed a Greenhouse Gas Emissions Inventory for Sacramento County, which included government and community-wide emissions inventories for the unincorporated county and cities of Citrus Heights, Elk Grove, Folsom, Galt, Isleton, Rancho Cordova, and Sacramento. In 2010, Elk Grove staff completed an update of the City's June 2009 Inventory to ensure that the community-wide inventory for Elk Grove utilizes accurate and up-to-date information and methodology. The revised Inventory still retains a baseline year of 2005, but modifications to the Inventory were completed to both the government operations inventory and the community-wide inventory in order to streamline Climate Action Plan analysis. The review and update is not intended to be a formal revision or addendum to the adopted Inventory; rather, the review and update presents a new approach to the City Inventory for the purposes of the Climate Action Plan.

The City updated the government operations inventory to adhere to the Local Government Operations Protocol v1.1 released in May 2010 by the California Air Resources Board. Unlike municipal GHG inventories, community-wide inventories do not have a state protocol to follow. Inventories instead rely on best practices and a draft international protocol named the International Local Government GHG Emissions Analysis Protocol (IEAP) version 1.0 developed by ICLEI – Local Governments for Sustainability.

Following IEAP principles and best practices among California local government greenhouse gas inventories, staff modified the community-wide inventory to exclude some emissions sources that the City has no power to control or affect through this CAP or any other action. The City also omitted some emissions sources or sectors where the methodology was not supported by protocol or best practices. Several sectors excluded from the updated inventory include high global warming potential GHGs for electricity transmission, emissions from waste-in-place generated outside of Elk Grove but landfilled within the community, and off-road emissions from activities not occurring in Elk Grove such as watercraft operation.

The City also updated the transportation analysis of the Inventory with new data from the County. The original analysis calculated emissions from all vehicle miles in the jurisdictional boundary of Elk Grove, regardless of origin or destination. The updated analysis calculates emissions from vehicle miles that have an origin and/or a destination in Elk Grove. The new methodology was developed by the State in its efforts to implement SB 375 (see Chapter 2, Background).

The update to the transportation sector and exclusion of irrelevant GHG emissions decreased the City's community-wide inventory by approximately 105,133 metric tons of carbon dioxide equivalent (CO_2e). For additional details on the 2010 Inventory review and update, please refer to **Appendix A.**

INVENTORY STRUCTURE

The Inventory is separated into two sections, or distinct inventories: community-wide and City government operations. The community-wide

section provides an assessment of activities throughout the community, and the City government operations section provides a more detailed analysis of the City government's contribution to GHG emissions, including those from streetlights, building energy use, fleet vehicles, and more. It is important to note that the City government operations (municipal) inventory is a subset of the community inventory, meaning that all City government operations are included in the commercial/industrial, transportation, waste, or "other" categories of the community-wide inventory. The City's government operations inventory should not be added to the community analysis; rather it should be looked at as a slice of the complete picture of local emissions trends.

Although City operations are a small contributor to the community's overall emissions levels, an inventory allows the City to track its individual facilities and vehicles and to evaluate the effectiveness of its emissions reduction efforts at a more detailed level. Specifying municipal emissions and establishing programs for municipal emissions reductions also demonstrates the City's leadership in achieving this Climate Action Plan's targets.

UPDATED 2005 GREENHOUSE GAS EMISSIONS INVENTORY

For the baseline year of 2005, government operations resulted in approximately 8,662 metric tons of carbon dioxide equivalent (CO_2e). As shown in **Figure 3-1** and **Table 3-1**, the City vehicle fleet was the largest emitter, producing 86 percent of all municipal emissions. **Figure 3-2** and **Table 3-2** show that community-wide activities (including municipal operations) resulted in approximately 737,838 metric tons of CO_2e. The transportation sector generated the most emissions, creating approximately 357,309 metric tons of CO_2e, or 48.43 percent of total emissions. Transportation sector emissions are the result of diesel and gasoline combustion in vehicles traveling on local roads and state highways (e.g., State Route 99) that pass through the jurisdictional boundaries of Elk Grove.

The transportation sector generated the most emissions in the City of Elk Grove, creating approximately 48 percent of total emissions.

Figure 3-1. *2005 Greenhouse Gas Emissions (CO_2e) from City Operations*

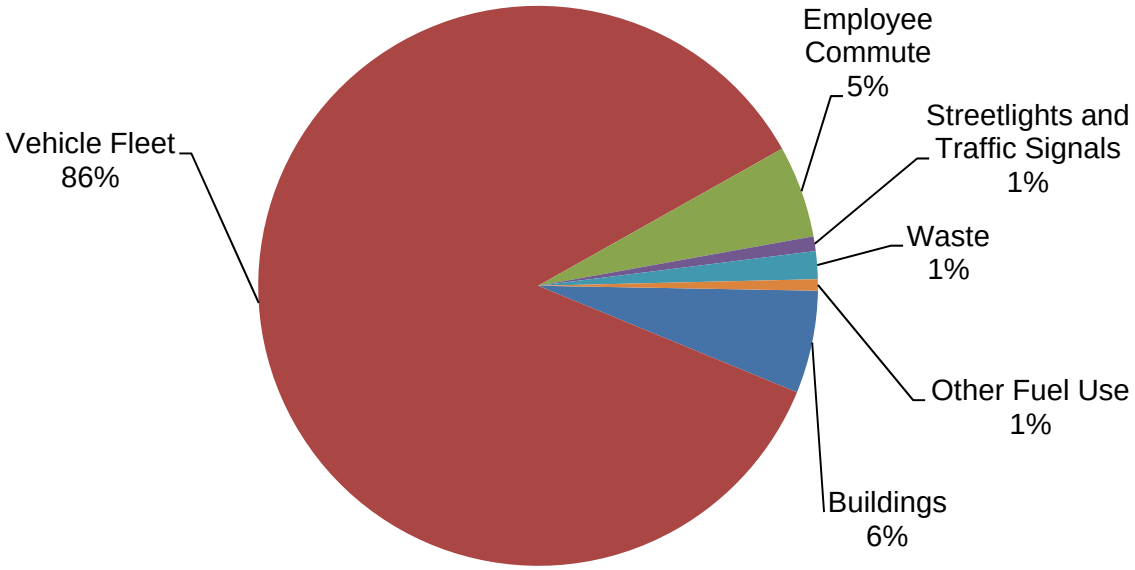


Table 3-1. *2005 Greenhouse Gas Emissions from City Operations*

Sector	Metric Tons CO_2e	Percentage
Buildings	514	5.93%
Vehicle Fleet	7,418	85.64%
Employee Commute	461	5.32%
Streetlights and Traffic Signals	73	0.84%
Waste	139	1.60%
Other Fuel Use	57	0.66%
Total	**8,662**	**100.00%**

Figure 3-2. *2005 Greenhouse Gas Emissions (CO_2e) from Community-Wide Sources*

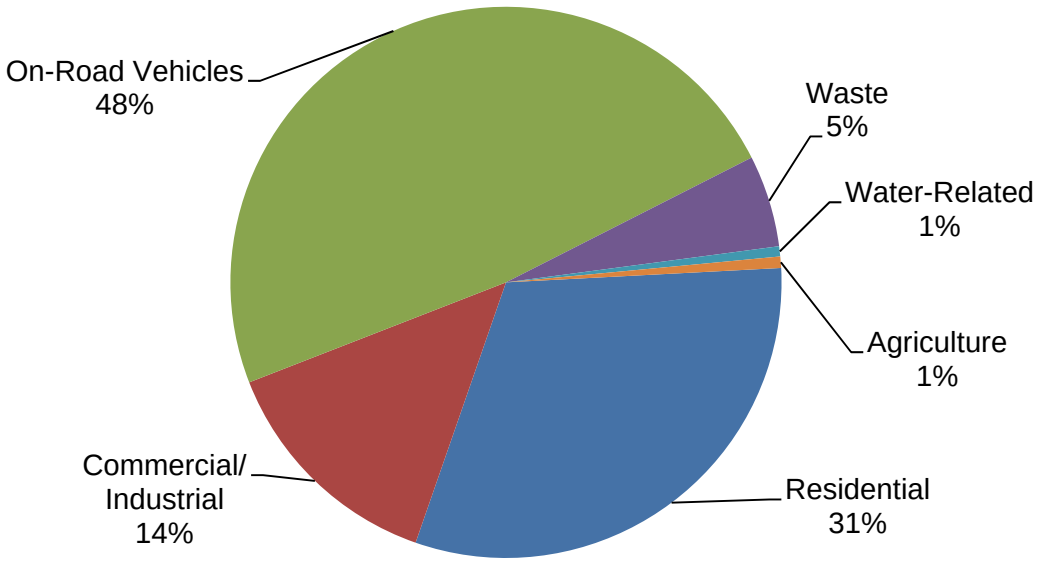


Table 3-2. *2005 Community-Wide Greenhouse Gas Emissions by Sector*

Sector	Metric Tons CO_2e	Percentage
Residential	229,841	31.15%
Commercial/Industrial	101,607	13.77%
Transportation	357,309	48.43%
Waste	39,791	5.39%
Water-Related	4,371	0.59%
Agriculture*	4,919	0.67%
Total	**737,838**	**100.00%**

Notes:
[1] Agriculture includes emissions from off-road vehicles and other agricultural activities.

2020 and 2025 Greenhouse Gas Emissions Forecast

Emission forecasts depict what will happen if existing trends continue unchecked by the actions established in this Plan.

COMMUNITY-WIDE FORECAST

The City modeled future emissions growth based on projected trends in energy use, driving habits, job growth, and population growth in 2020 and 2025. Forecasts allow the City to assess the effectiveness of various reduction strategies. Forecasts also provide a snapshot of how annual emissions levels will likely change under various scenarios.

WHY 2020 AND 2025 FORECAST YEARS? The City chose the forecast year of 2020 to align with Assembly Bill 32, which creates a statewide emission reduction target of 15 percent below 2005 levels by 2020. The City also modeled the forecast year 2025 because it is the Elk Grove General Plan buildout[1] year which allows the City to evaluate the effectiveness of reduction measures that are also General Plan measures.

The basis for all growth scenarios is a business-as-usual (BAU) projection. A BAU projection predicts how greenhouse gas emissions will increase if consumption behavior and efficiencies do not change from baseline levels, yet population, households, and vehicle miles traveled continue to increase. Under a BAU

[1] Consistent with state law, "buildout" is the maximum amount of development and population growth that the City could expect under the General Plan land use designations.

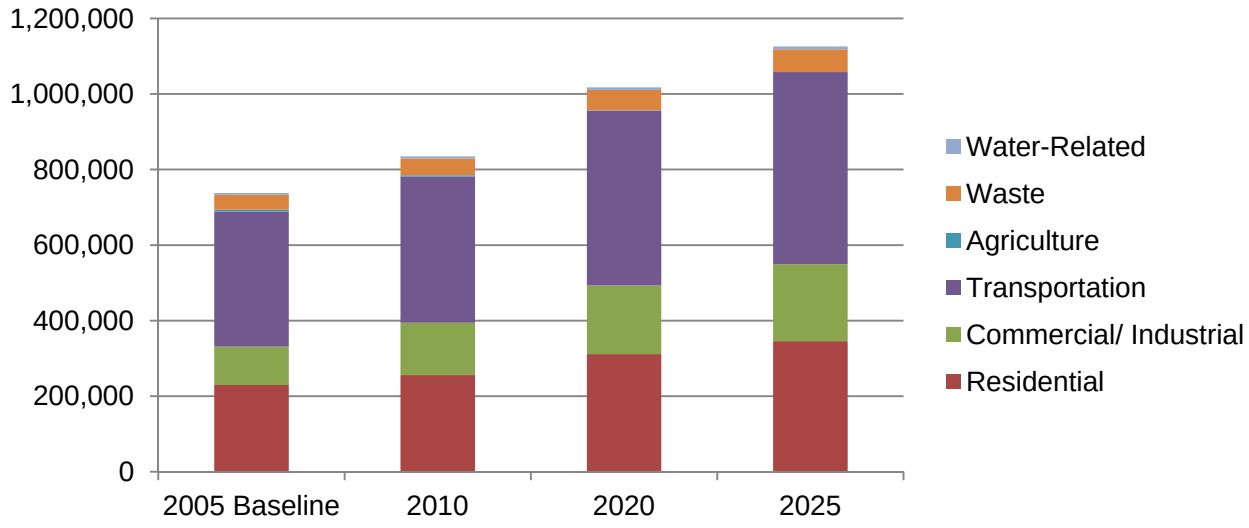
scenario, the City of Elk Grove's emissions will grow by approximately 37.9 percent by the year 2020, from 737,838 to 1,017,499 metric tons CO_2e. By 2020, the City's BAU emissions are modeled to increase 52.6 percent to 1,125,691 metric tons CO_2e. **Table 3-3** and **Figure 3-3** show the results of the forecast.

Table 3-3. *Business-as-Usual (BAU) Greenhouse Gas Emissions Forecast – 2020 and 2025*

GHG BAU Forecast	Metric Tons CO_2e		
	2005	2020	2025
Residential	229,841	311,554	345,748
Commercial/Industrial	101,607	181,758	203,498
Transportation	357,309	462,210	508,997
Agriculture[1]	4,919	1,230	0
Waste	39,791	53,937	59,857
Water-Related	4,371	6,811	7,591
Total	737,838	**1,017,499**	**1,125,691**
Percentage Increase from 2005	–	**37.90%**	**52.57%**

Notes:
[1] Agriculture includes emissions from off-road vehicles and other agricultural activities.

Figure 3-3. *Comparison of Business-as-Usual Emission Forecast by Sector – 2020 and 2025*



The business-as-usual forecast depicted above in **Figure 3-3** excludes anticipated reductions that will occur at the statewide level, which are discussed below.

INCORPORATION OF STATE REDUCTIONS INTO FORECASTS

Pursuant to standard practice, the City adjusted the BAU forecast to demonstrate how the State's actions will impact local emissions, even if no local actions are taken. The state actions included in this adjustment have been approved, programmed, and/or adopted by the state, or, in the case of the Sacramento Municipal Utility District-Renewables Portfolio Standard (SMUD-RPS), the utility provider has elected to voluntarily comply with a State-recommended goal. Furthermore, they are programs or projects that require no local involvement. Incorporating them into the forecast and reduction assessment provides a more accurate picture of future emissions growth and the responsibility and ability of local governments versus the state to reduce greenhouse gas emissions. A brief description of each of these items is provided below.

- **Assembly Bill 1493 (Pavley).** Signed into law in 2002, AB 1493 will require carmakers to reduce greenhouse gas emissions from new passenger cars and light trucks beginning in 2011. Regulations were adopted by the California Air Resources Board (CARB). It is expected that new vehicles sold in California will result in an average of 16 percent less greenhouse gas emissions than current models. These standards were recently adopted by the US EPA and will become national standards through 2016. CARB will continue to coordinate with the US EPA and the Department of Transportation to develop fuel standards for 2017–2025 vehicle model years.
- **Low Carbon Fuel Standard.** The State is proposing to reduce the carbon intensity of transportation fuels consumed in California through a Low Carbon Fuel Standard (LCFS) being developed by CARB. Standards would reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020 and 20 percent by 2035 as called for by Governor Schwarzenegger in Executive Order S-01-07. The LCFS will also incorporate compliance mechanisms that provide flexibility to fuel providers in how they meet the requirements to reduce greenhouse gas emissions. Although a federal district court judge ruled in late 2011 that California's Low Carbon Fuel Standard violates the dormant commerce clause by discriminating out of state ethanol products and that CARB failed to identify alternative methods for achieving greenhouse gas reductions, the ruling has been appealed by CARB, and CARB is proceeding with rulemaking development for LCFS implementation.
- **Title 24 (CALGreen) – 2008 Standards.** The 2008 Title 24 update went into effect on January 1, 2010. The energy reductions quantified in the forecast are the mandatory improvements over the 2005 Title 24 Code that were established by the 2010 update,

which will remain in effect until the effective date of the 2013 triennial edition. The 2013 triennial update was adopted on May 31, 2012, and will go into effect on January 1, 2014. This inventory focuses on two sections of Title 24: Part 6 (the California Energy Code) and Part 11 (the California Green Building Standards Code). These two sections require direct electricity, natural gas, and water savings for every new home or business built in California. Title 24 is a statewide standard applied at the local level by local agencies through project review. Title 24 requirements apply to energy use associated with water heating, space cooling, space heating, and other building processes.

- Although Title 24 standards apply statewide, application of these standards takes place at the local level by local agencies through project review. The revamped CALGreen standards that come into effect January 1, 2011, do not provide additional mandatory reductions in energy consumption that can be quantified as an anticipated alteration to business-as-usual trends; rather, CALGreen establishes optional tiers for enhanced energy efficiency and conservation that can be implemented at the discretion of local governments. These optional reductions are captured as a local reduction measure in **Chapter 4**, since they will only be achieved through local action.

In addition to these state-led reductions, the Sacramento Municipal Utility District (SMUD) has committed to a Renewables Portfolio Standard (RPS) that aligns with state legislation. Established in 2002 in Senate Bill 1078, the state-mandated RPS requires investor-owned utility providers to increase the portion of energy that comes from renewable sources to 20 percent by 2010 and by 33 percent by 2020. In April of 2011, Governor Brown signed Senate Bill X1-2, which expanded the application of RPS to all electricity retailers, including public utilities. All public utilities are required to adopt the RPS target of 20 percent renewable electricity sources by 2013, 25 percent by 2016, and 33 percent by 2020. Prior to Senate Bill X1-2, SMUD, a publicly owned utility, had already elected to comply with the RPS standards. SMUD's 2010 electricity mix achieved the 2010 RPS goal of 20 percent renewable electricity supply.

Other state initiatives such as funding mechanisms and loan programs are not included in state reductions. Rather, they are included within the local reductions as appropriate because of the need for or requirement for local government implementation or contribution to the effort.

The state- and utility-led efforts described above are anticipated to decrease the BAU forecast by approximately 21.1 percent or by 214,539 metric tons CO_2e by 2020. By 2025, state- and utility-led efforts are expected to decrease BAU emissions by 24.9 percent or 280,077 metric tons CO_2e. Since these reductions will occur with or without local action, they are accounted for in the adjusted GHG forecast rather than in the Climate Action Plan reduction summary. The BAU and adjusted forecasts are shown in **Figure 3-4**.

MUNICIPAL FORECASTS

To depict municipal emissions growth for the forecast years 2020 and 2025, existing trends, planned expansions, and levels of service were taken into account. Municipal forecasts and reductions will be captured within the umbrella of community-wide reductions. All changes in municipal emission trends will ultimately feed into achievement of community-wide targets and are therefore credited as community-wide progress toward reduction goals.

Numerous factors informed municipal forecasts. Some City services are expected to expand proportional to population growth while others were connected to the City's plans to expand or create new City services and facilities. In general, the size of municipal facilities was correlated with energy consumption and waste generation to determine rates of change. Emissions from the vehicle fleet account for planned fleet expansion and anticipated improvements in vehicle fuel efficiency.

Greenhouse Gas Emissions Reduction Target

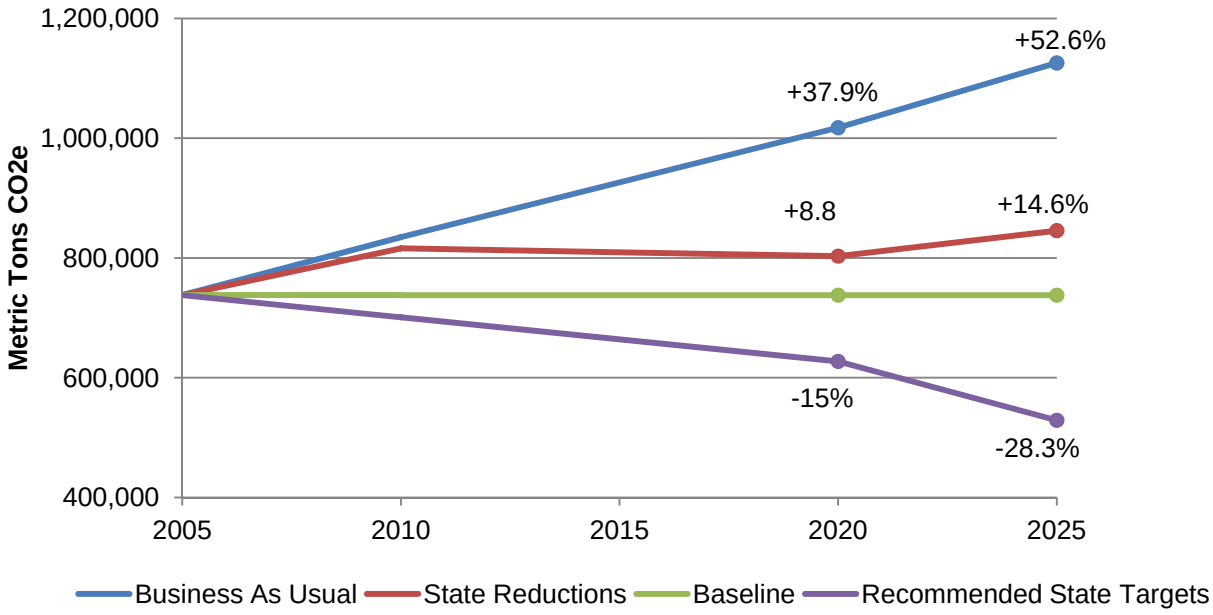
The CAP implements the following General Plan Sustainability Element policy:

> ***S-5*** *Reduce greenhouse gas emissions from community-wide sources, including City facilities and operations, by a minimum of 15 percent below 2005 levels by 2020.*

Based on the 2005 emissions inventory and forecasts presented in this chapter, the 2020 community-wide emissions reduction target is 627,162 metric tons CO_2e. This binding and enforceable target represents a 2020 emissions level below which the contribution to community-wide GHG emissions from activities consistent with the General Plan and this CAP would not be cumulatively considerable under CEQA. The City's target is consistent with statewide efforts established in the CARB *Climate Change Scoping Plan* to reduce statewide GHG emissions to 1990 levels by 2020, and 80% below 1990 levels by 2050.

Figure 3-4 provides a comparison of the business-as-usual forecasts for 2020 and 2025 to the 2005 baseline year and the 15 percent reduction target. **Figure 3-4** is also a depiction of the challenge that Elk Grove will face in attempting to meet its reduction target. Emissions will continue to increase along the forecast scenario while reduction efforts are initiated. Achieving the target is therefore more than a 15 percent decrease; rather, it is a 28 percent reduction from 2020 emissions levels after state adjustments. In 2025, the gap between future growth and target reduction levels increases to 34.8 percent. In **Figure 3-4,** this gap is depicted by the difference between the red line and the purple line, both of which show projected increases or desired decreases relative to the green-colored baseline.

Figure 3-4. *Comparison of 2020 and 2025 Forecasts to Baseline and Reduction Target, Shown by Percentage Change from Baseline*



Reduction Strategy

This chapter summarizes the Climate Action Plan's measures to reduce greenhouse gas emissions from municipal operations and community-wide sources within City boundaries.

Summary of Policy Topics and Measures

The City's actions to reduce greenhouse gas (GHG) emissions are referred to as *measures*. All measures are grouped and presented in four policy topics: an Innovative and Efficient Built Environment, Resource Conservation, Transportation Alternatives and Congestion Management, and Municipal Programs. Detailed GHG reduction calculations are presented in **Appendix B**. Reductions for all measures, aggregated by policy topic, are presented below in summary form. Detailed descriptions of each policy topic follow on page 4-4.

This icon identifies measures based on existing policies, codes, or programs.

The following summary information is presented for each of the four policy topics when available:

2010 Existing and In-Progress Reductions: The annual reductions in GHGs in calendar year 2010 resulting from implementation of the goal prior to or concurrent with this Plan (2005–2010).

2020 and 2025 Reductions: The annual reductions in GHGs in calendar years 2020 and 2025 are a result of staggered policy implementation and ramp-up. Note that due to rounding, 2020 and 2025 reductions may not equal the sum of each supportive measure for the policy topic.

Responsible City Department(s)/Agency: City department or outside agency responsible for implementation.

Cost to City: Net cost to the City for implementation of the goal after revenues and rebates. Incremental costs were estimated in current (2010) dollars (e.g., 2030 costs are in addition to 2010 and 2020 costs, not inclusive of 2010 and 2020 costs).

- Negligible = $0 or less (requires no investment or generates a profit)
- Low = under $25,000 (uses existing staff)
- Low-Mid = $25,000 to $100,000 (existing staff can implement but will require reprioritization of workload)
- Medium = $100,000 to $200,000 (requires new staff or contracts to implement)
- Medium-High = $200,000 to $500,000 (requires new staff or contract(s) to implement)

- High = over $500,000 (requires new staff or contract(s) to implement)

Private Investment: The level of private investment needed for the goal assumptions to come to fruition. (Example: The overall cost of solar panel installations before year 2020 or 2030.) Costs are incremental and in current (2010) dollars (e.g., 2030 costs are in addition to 2010 and 2020 costs, not inclusive of 2010 and 2020 costs).

- Minimal = less than $25,000
- Low = $25,000 to $500,000
- Low-Mid = $500,000 to $1,000,000
- Medium = $1,000,000 to $10,000,000
- Medium-High = $10,000,000 to $30,000,000
- High = Over $30,000,000

This information is provided for each policy topic as an aggregated summary of all measures within that policy topic. Following this aggregated summary, each supporting measure is listed and detailed. Directly following each measure are parenthetical notes of which existing City plans or documents are aligned with the measure, such as General Plan policies and Housing Element strategies. A full description of the methodology and assumptions utilized for each measure is provided in **Appendix B.**

Attainment of Reduction Targets

The measures presented here have the potential to reduce GHG emissions by 175,832 metric tons (MT) of CO_2e by 2020. These reductions are equivalent to a 15.00 percent reduction from 2005 baseline levels. Due to higher forecast rates of growth in emissions sectors between 2020 and 2025, the forecast emissions reduction by 2025 drops slightly to 14.70 percent below baseline by 2025, equivalent to a reduction of 216,272 $MTCO_2e$.

Local implementation of all proposed measures and State-mandated efforts would allow the City to achieve its reduction target of 15 percent below baseline levels by 2020. The City's 2020 target is consistent with Assembly Bill (AB) 32; therefore, implementation of the goals and measures in this Climate Action Plan (CAP or Plan) will place the City on a trajectory to be consistent with the State's recommended goal for local governments.

The City's 2025 reduction achievement of 14.70 percent does not follow a trajectory toward the State's 2050 reduction target of 80 percent below 1990 levels by 2020. However, it is likely that the City's actual 2025 reduction achievement will surpass that which can be calculated at this time due to technical innovations and developments to state policy. For example, the State is expected to increase the Renewables Portfolio Standard, AB 1493, and the Low Carbon Fuel Standard after 2020; however, until the State does so, the CAP assumes a constant reduction from these policies after 2020.

Tables 4-1 and **4-2** present the potential GHG emissions reductions ($MTCO_2e$) for 2020 and 2025 by policy topic and then by sector. **Figures 4-1** and **4-2** display the proportion of 2020 GHG reductions from each policy topic and sector. The tables and figures also identify Elk Grove's progress in achieving these goals since the baseline year of 2005. Policy topics and

measures are summarized in detail later in this chapter.

What is the difference between a policy topic and a sector?

Policy topics are aggregate groups of Elk Grove's measures that correspond to emissions sources in the GHG Inventory. They are simply a way to present and communicate emissions reduction measures clearly. Each policy topic yields a quantifiable reduction in GHG emissions.

Sectors refer to the source or activity that creates GHG emissions, regardless of the policy topic it falls under. Sectors are more universal and demonstrate the types of emissions-generating activities that are being affected through the CAP. For instance, commercial, residential, waste, and transportation are common sectors.

Together, policy topics and sectors paint a more comprehensive picture of how the CAP affects GHG emissions in the City of Elk Grove.

Table 4-1. *GHG Reductions by Policy Topic ($MTCO_2e$)*

Policy Topic	2010	2020	2025
An Innovative and Efficient Built Environment	-217	-37,240	-52,199
Resource Conservation	-2,162	-28,221	-31,304
Transportation Alternatives and Congestion Management	-29,904	-108,221	-129,166
Municipal Programs	-94	-2,149	-3,604
Total Reductions	**-32,377**	**-175,831**	**-216,273**
Emissions Forecast	**816,001**	**802,959**	**845,612**
Net Emissions with CAP Reductions	**783,624**	**627,128**	**629,339**
Percentage Change from 2005 Levels (737,838 $MTCO_2e$)	**6.21%**	**-15.00%**	**-14.70%**

Figure 4-1. *2020 Reductions by Policy Topic (CO_2e)*

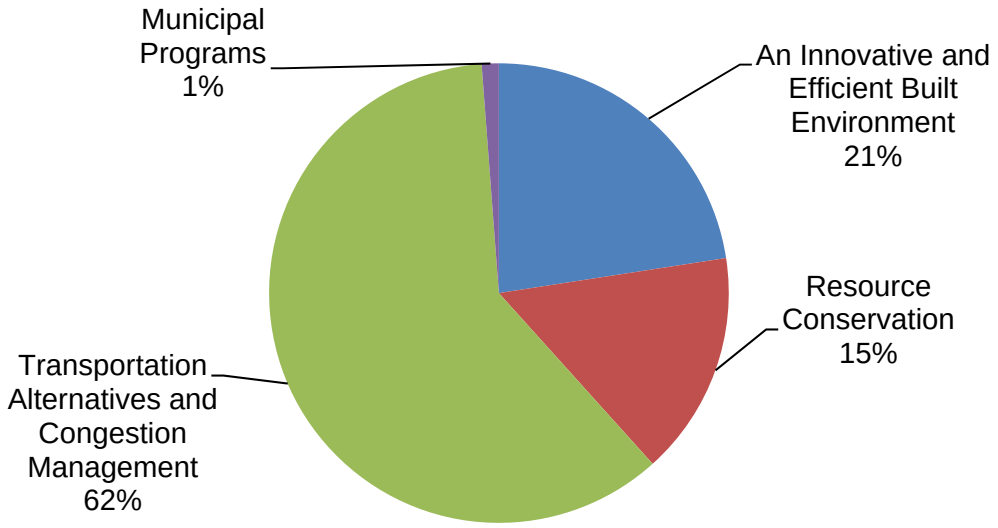

Municipal Programs 1%
An Innovative and Efficient Built Environment 21%
Resource Conservation 15%
Transportation Alternatives and Congestion Management 62%

Figure 4-2. *2020 Reductions by Sector (CO_2e)*

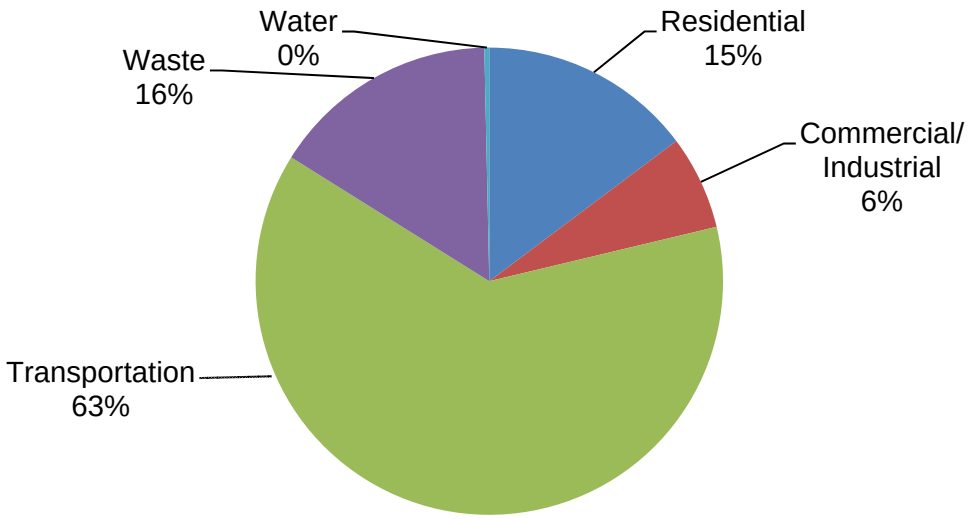
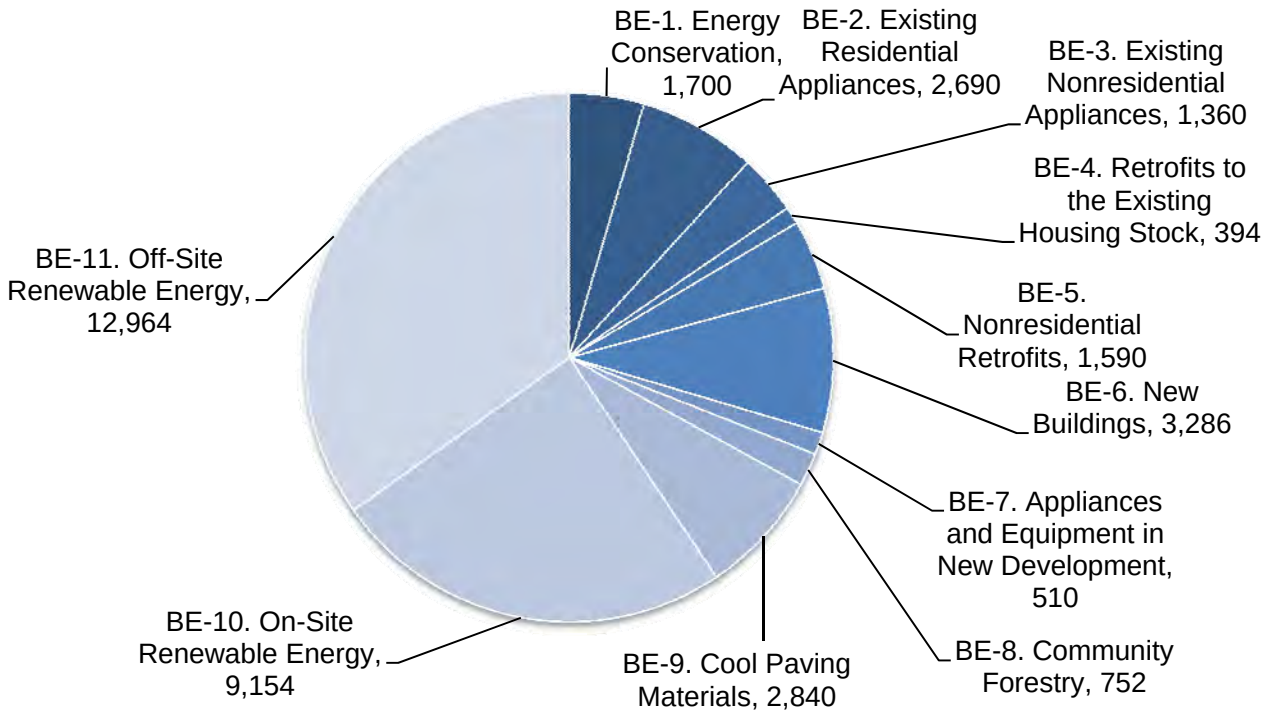


Table 4-2. *Reductions By Sector (CO_2e)*

	2020	2025
Residential	-25,958	-36,373
Commercial/Industrial	-11,416	-16,002
Transportation	-110,137	-132,446
Waste	-27,726	-30,805
Water	-595	-646
Agriculture	0	0
Total	-175,832	-216,272

An Innovative and Efficient Built Environment (BE)

Figure 4-3. *Be Greenhouse Gas Reductions By Measure In 2020 (CO_2e)*


BE-1. Energy Conservation, 1,700
BE-2. Existing Residential Appliances, 2,690
BE-3. Existing Nonresidential Appliances, 1,360
BE-4. Retrofits to the Existing Housing Stock, 394
BE-5. Nonresidential Retrofits, 1,590
BE-6. New Buildings, 3,286
BE-7. Appliances and Equipment in New Development, 510
BE-8. Community Forestry, 752
BE-9. Cool Paving Materials, 2,840
BE-10. On-Site Renewable Energy, 9,154
BE-11. Off-Site Renewable Energy, 12,964

GHG Reductions per Year (Metric Tons CO_2e)	
To Date:	-217
2020:	-37,240
2025:	-52,199
Responsible City Department/Public Agency	
Planning, Building, and Public Works	
Cost to the City	
Medium	
Private Investment	
High	

The built environment is a dynamic system, in which settings characterized by human intervention depend on a constant energy supply. Through the consumption of energy, the built environment creates GHG emissions. However, the existing level of energy consumption is not necessary to support existing or future communities. Energy consumption is often inefficient and wasteful, and can be changed to reduce GHG emissions and conserve natural resources. Often, actions that reduce GHG emissions also have the co-benefit of improving standards of living and reducing energy costs.

The following reduction measures target the relationship between Elk Grove's built environment and energy consumption, depicting how changes in construction, achievement of enhanced energy efficiencies, and a more energy-efficient production strategy will reduce GHG emissions and ensure Elk Grove's long-term energy security.

SUPPORTING MEASURES FOR THE BUILT ENVIRONMENT (BE)

BE-1. Building Stock: Promote Energy Conservation

Promote energy conservation by residents and businesses in existing structures in close coordination with other agencies and local energy providers, including the Sacramento Municipal Utility District (SMUD) and Pacific Gas and Electric (PG&E).

Existing Efforts

Builds on utility programs

Energy conservation can be achieved through small changes to daily behaviors with little to no upfront investment. Simple actions such as turning off lights or cleaning refrigerator coils will yield energy savings without the need for financial investment. Through this measure, the City of Elk Grove will encourage similar small-scale changes that will yield energy reductions and cost savings for residents and businesses.

In addition, this measure relies on statewide programs and regulations that facilitate ongoing energy benchmarking and tracking as tools that help energy users to understand and efficiently consume energy.

The City will also use funding from the Energy Efficiency and Conservation Block Grant (EECBG) to conduct customized marketing to identify opportunities for local actions that can

reduce energy use. There is often a decision gap between energy use and awareness of energy trends. Feedback is critical to improved decision-making by connecting decisions with outcomes. According to the American Council for an Energy-Efficient Economy (2010), achieving energy efficiency targets requires self-motivated action. This measure works to promote voluntary energy efficiency opportunities to close the decision gap between energy consumption and available opportunities for energy efficiency. This approach will help to identify and incentivize energy efficiency programs

SMUD and PG&E are implementing "smart grid" initiatives as part of a statewide shift to update and enhance the infrastructure necessary to support efficient energy service. These programs include the installation of smart meters for all energy accounts and the deployment of new customer programs for informed energy use. At an individual scale, users will be able to use smart meters to monitor electricity consumption in real time and understand the relationship between electricity usage and costs.

California AB 1103 also requires that all owner-occupied nonresidential buildings report energy consumption in a manner that is compatible with the Energy Star Portfolio Manager and that owners or operators disclose benchmarking data and ratings to prospective buyers. Initial compliance with AB 1103 is scheduled to begin January 1, 2013. This measure anticipates the reductions in energy use from appliances that can be facilitated through more informed energy tracking.

Action Items

- Use the City's EECBG funding to conduct a targeted outreach campaign to identify unique energy behaviors and opportunities in Elk Grove.
- Work closely with SMUD, PG&E, and other private partners to support widespread social marketing and prepare tools to encourage conservation and greater efficiency in energy behaviors.
- Partner with the Elk Grove Chamber of Commerce, the Sacramento Sustainability Forum, and utility providers to launch an energy efficiency program for local businesses that promotes cost-effective business behaviors.
- Support PG&E and SMUD in-home monitoring program participation through smart grid programs and advocate for pilot neighborhood competitions throughout Elk Grove.
- Leverage resources from PG&E and SMUD to support enhanced local education to local businesses on the nonresidential energy use disclosure program (AB 1103) and programs for energy monitoring, such as the Energy Star Portfolio Manager.
- Provide educational materials to encourage participation in energy monitoring programs at large multi-tenant commercial developments through SMUD and PG&E programs or via the Energy Star Portfolio Manager.

BE-2. Building Stock: Residential Appliances in Existing Development

Support residential upgrades to more energy-efficient, cost-saving appliances for existing homes, leveraging regional and state resources to target indoor and outdoor appliances and equipment in existing homes.

Existing Efforts

Builds on utility programs

As houses age, their appliances, water heaters, HVAC units, windows, and insulation often become outdated or decrease in efficiency. This measure facilitates upgrades by connecting residents to cash incentives for appliances that reduce energy bills and maintenance costs. The State of California, Sacramento County, SMUD, PG&E, and Sacramento Area Council of Governments (SACOG) offer numerous rebates for residential appliances. Elk Grove will work to inform residents and businesses of these available programs via the City website, newsletter, and handouts at community events.

The City's additional outreach will help to educate residents about cost-effective appliance upgrades. For instance, many Elk Grove homes have outdoor pools. Pool pumps and filtration systems are commonly oversized and operate at a single speed, expending more energy than is necessary to maintain a pool. Older pool pumps are commonly energy-intense, single-speed models. Newer two-speed or variable-speed pool pumps allow the system to shift speeds as appropriate, functioning at lower speed while maintaining adequate water circulation. According to SMUD, an upfront investment in a more efficient pool pump may yield significant ongoing energy savings between 25 percent and 60 percent of average residential energy costs.

Action Items

- Educate City residents about rebate offerings for appliances and equipment as programs become available for Energy Star and other qualified appliances, including those offered by utility providers, the California Energy Commission, and the Sacramento Metropolitan Air Quality Management District.
- Work with SMUD and Sacramento County to conduct targeted mailings to homeowners with pools to promote financial incentives for upgrades of residential pool pumps to more efficient, variable-speed pumps. Pool owners will be identified with County assessors parcel data and GIS files.
- Identify opportunities to partner with other Sacramento communities to pursue bulk procurement of discounted variable-speed pool pumps in order to offer efficient pumps at affordable rates to residents.
- Promote free utility assessments of appliances and heating, ventilation, and air conditioning units in partnership with SMUD and PG&E. Opportunities likely exist in the community's older suburbs, and City staff may leverage efforts with existing resources, such as the City's Home Repair and Rehabilitation Program.

- Partner with SMUD to promote SMUD's multi-family prescriptive rebates for multi-family improvements to appliances, lighting, and other equipment upgrades.

BE-3. Building Stock: Nonresidential Appliances in Existing Development

Equip businesses in Elk Grove to reduce operational expenses and maximize energy efficiency through the use of energy-efficient and cost-effective indoor and outdoor appliances and equipment.

Existing Efforts

Builds on utility programs

Energy use is an operational expense that takes revenues out of a company's bottom line. Further, newer, energy-efficient equipment typically reduces ongoing maintenance costs. Statewide, California businesses' electricity expenditures as a percentage of total operating expenses are 15 percent below the rest of the country. From 1992 to 2007, operating costs spent on electricity dropped in California by 21 percent, whereas the rest of the United States only experienced an 18 percent drop. Efficiency and conservation of resources is a strategy not only to save money but also to improve a company's resilience to external shocks, enhancing a competitive market edge (Next10, 2010).

The City of Elk Grove will encourage local businesses to transition to appliances that help them to save money and operate more effectively. Numerous programs through PG&E and SMUD provide free to low-cost appliances, lighting, and installation services. The City will leverage these resources as a strategy to support economic development throughout the community.

Action Items

- Work with SMUD and PG&E to promote free appliance improvements and rebate programs, including rebates for lighting, motors, office equipment, and heating and cooling systems.
- Integrate materials on energy efficiency resources and opportunities into the City's economic development resources.
- Create a standardized tenant improvement checklist and informational materials to encourage the installation of Energy Star and energy-efficient appliances through the tenant-improvement process.
- Partner with SMUD and PG&E to promote the optimization of information technology systems in office complexes to reduce energy expenses and equipment maintenance costs, including plug load sensors, server virtualization, the use of remote desktops, and more.
- Encourage energy-intense uses to incorporate energy management practices in business operations.

- Promote SMUD's custom and prescriptive lighting standards and rebates for qualifying commercial lighting systems, and support outreach efforts through targeted mailings or direct outreach to the business community through the Chamber of Commerce and other networks.
- Work collaboratively with other cities in the region to establish a regional Property Assessed Clean Energy (PACE) program that will allow Elk Grove property owners to obtain low-interest financing for energy efficiency improvements.
- Continue to connect businesses and residents with programs that provide free or low-cost energy efficiency audits and retrofits.
- Conduct public outreach to inform residents about energy usage and energy costs.
- Partner with local energy providers to develop a pilot program to demonstrate energy efficient upgrades in existing municipal buildings.

BE-4. Building Stock: Retrofits to the Existing Housing Stock

Promote retrofits in the existing residential housing stock, leveraging existing local programs and regional resources to reduce household energy costs and increase home values.

Existing Efforts

Builds on utility programs

Existing buildings are often a major contributor to a city's energy use, especially for buildings built before the California Building Code became more stringent in the early 1990s. Through retrofits and improvements to the building envelope, homes can become more energy-efficient and increase in resale value. The City will actively promote voluntary improvements to the existing housing stock, leveraging regional rebates, financing, and other retrofit incentives.

The Sacramento region has a strong history of implementing successful voluntary residential efficiency programs. This measure builds on these regional efforts, relying on the regional resources provided by SMUD, PG&E, Sacramento Metropolitan Air Quality Management District, other partners, and grant sources. For example, the City will work closely with SMUD to identify older target neighborhoods that are good candidates for a universal set of prescriptive retrofit improvements. Such efforts build on SMUD's Neighborhood Program, which has already been deployed in two other neighborhoods in Sacramento County. The City will also work closely with regional partners to promote the resale benefits of residential green rating systems, such as GreenPoint Rated. Homeowners may be able to benefit from such voluntary certification programs while improving

the quality of the residential housing stock in Elk Grove.

Action Items

- Partner with SMUD, PG&E, and other communities in the Sacramento region to encourage residents to participate in regional and State-funded retrofit rebate programs, such as Energy Upgrade California.
- Promote the SMUD Home Performance Program to homeowners, which provides tiered rebates for electricity savings achieved through energy upgrades.
- Promote energy and green building labeling as a tool to increase property values in partnership with utility providers, the Sacramento Association of Realtors, Sacramento County, the Sacramento Metropolitan Air Quality Management District, and the Sacramento Region Public Agency Council.
- Work with regional partners, the real estate community, and Sacramento County to develop a regional green building labeling pilot project, through which remodels or additions complying with the GreenPoint Rated label or other green building certification would be eligible for financial incentives.
- Work with SMUD to develop a neighborhood program or other effort for older developments in Elk Grove, targeting similar residential neighborhoods for the deployment of cost-effective upgrade packages applicable to all homes.
- Create a list of neighborhoods with uniform building types to target for audits that may be applicable to identify feasible, cost-effective improvements for an entire subdivision or neighborhood.
- Integrate energy efficiency strategies into the City's Community Development Block Grant planning process and implementation, specifically to address the needs of the community's affordable housing stock, as identified in the CBDG Strategic Plan.
- Continue to implement home energy efficiency improvements through SMUD's Energy Efficient Remodel Demonstration Program, building on past innovative partnerships with private groups such as Towne Development of Sacramento and Neighborworks that allowed the City to use Neighborhood Stabilization Program funds for energy-efficient home improvements.
- Identify local funding institutions willing to provide affordable, low-interest loans for residential energy efficiency improvements.
- Continue to partner with SMUD and the Sacramento Housing Alliance to retrofit affordable and/or multi-family homes within Elk Grove.
- Promote PACE financing for multi-family complexes through the Figtree PACE progam.

BE-5. Building Stock: Nonresidential Retrofits

Facilitate retrofits and energy efficiency improvements within the existing nonresidential

building stock that reduce maintenance and operation costs.

Existing Efforts

Builds on existing utility programs

Businesses in California are eligible for a wide variety of financing options for energy efficiency improvements. The City of Elk Grove is participating in a unique PACE program, the Figtree PACE program. This financing program provides low-interest loans, with loan value determined by the property value. The loan requires no money down and is paid back annual over a period of up to 20 years. Upon property sale, the loan is transferred to the new owner.

In addition to the Figtree PACE program, commercial property owners can also obtain financing through several other vehicles, including traditional capital leases. A business can finance energy improvements through an energy service company, which can develop and install energy projects that are financed based on energy savings or other contract structures. While some financing agreements may require upfront investment, the intent of this measure is to encourage the transition to more cost-effective and energy-efficient buildings. These improvements also typically reduce maintenance costs and enhance the quality value and quality of building stock. The City will work closely with the business community to promote all opportunities and continue to advocate for local funding programs and financial incentives.

Action Items

- Continue to promote commercial retrofit financing through programs such as the Figtree PACE program, which provides low-interest loans to commercial and industrial uses for building energy improvements.
- Partner with SMUD, PG&E, the Chamber of Commerce, and other business partners to identify high opportunity local business candidates for cost-saving improvements and large energy reductions through deep retrofit or retrocomissioning programs.
- Work with the Elk Grove Chamber of Commerce and Sacramento County jurisdictions to educate business property owners on additional feasible options for retrofit financing options, such as including integration of retrofit costs into capital leases, mortgage refinancing, and agreements with energy savings performance companies.
- Promote retrofit opportunities and energy efficiency programs for local businesses through the City's economic development efforts.
- Disseminate resources to multi-tenant complexes and renter-occupied businesses to remove barriers to energy improvements, including model energy aligned lease provisions.

- Consider revising the City's Best in Business Award Program to recognize local businesses achieving significant energy reductions.

BE-6. Building Stock: New Construction
Adopt CALGreen Tier 1 standards to require all new construction to achieve a 15 percent improvement over minimum Title 24 CALGreen energy requirements.

This measure requires new development in Elk Grove to meet and exceed California's Energy Efficiency Standards for Residential and Nonresidential Buildings (Title 24, Part 11, of the California Code of Regulations, or CALGreen).

The California Code of Regulations (CCR), Title 24 (California Building Standards Code, hereinafter Title 24) includes requirements for the structural, plumbing, electrical, and mechanical systems of buildings and for fire and life safety, energy conservation, green design, and accessibility in and around buildings. The 2010 triennial edition of Title 24 applies to all occupancies that applied for a building permit on or after January 1, 2011, and remains in effect until the effective date of the 2013 triennial edition. This reduction measure is focused on two sections of Title 24: Part 6, the California Energy Code, and Part 11, the California Green Building Standards Code, or CALGreen Code.

The CALGreen Code includes mandatory minimum energy efficiency requirements for buildings. It also establishes two tiers of voluntary measures to achieve greater energy efficiencies and other benefits. Tier 1 is a 15 percent improvement over minimum requirements, and Tier 2 is a 30 percent improvement over minimum requirements.

As an immediate step to implement this reduction measure, all new construction shall achieve Tier I compliance (15 percent above the 2010 Title 24 CALGreen standards). The City will also continue to encourage voluntary actions such as compliance with Leadership in Energy and Environmental Design (LEED) or Build It Green GreenPoint rating systems.

Going forward, the City will evaluate the energy reduction potential of each Title 24 update and determine if a higher standard is necessary to achieve the building-related GHG reduction targets of this Climate Action Plan. The City's achievement of AB 32 reduction targets by 2020 depends on the assumption that Title 24 will be updated every three to five years and that new development will adhere to a higher standard than the minimum. The increase in efficiency with each Title 24 update is assumed to be consistent with past trends. Energy reductions for this measure are detailed in **Appendix B**.

Following each update to Title 24, the City will explore whether a level of energy efficiency is appropriate for the local economy and construction industry of the time. If the City determines that a higher Title 24 standard is not appropriate or feasible, then it is within the City's ability to determine a new or improved alternate strategy for achieving AB 32 targets by 2020.

Action Items

- Provide information to the public and builders on available energy conservation techniques and products to promote green building standards.
- Require all new development and major remodels to achieve Tier 1 of Title 24, Part 11 green building standards until the next Title 24 update becomes effective.
- Analyze future Title 24 updates released by the California Energy Commission and require the level of efficiency above minimum standards necessary to achieve the energy reduction potential outlined in this Plan.
- Partner with local energy provider(s) to develop a pilot program to demonstrate energy-efficient techniques and products in new municipal buildings.
- Support the use of innovative and alternative building materials and designs to improve efficiency, encouraging voluntary action such as compliance with LEED or Build It Green GreenPoint rating systems.
- Update the City's website and proactively work with applicants to make compliance with the energy efficiency standards as effective and efficient as possible.
- Partner with SMUD to promote SMUD's Savings By Design program, which provides cash incentives and technical assistance to help new commercial projects maximize energy efficiency.
- Collaborate with the Northern California Chapter of the US Green Building Council, SMUD, and PG&E to provide local training and workshops for energy efficiency and green building training.
- Continue to enforce zoning provisions that require outdoor lighting fixtures in parking areas to be energy efficient.

BE-7. Building Stock: Appliances and Equipment in New Development

Encourage the use of energy-efficient appliances and equipment in new buildings that maximize efficiency.

New development has a greater opportunity to install energy-efficient appliances that save costs and reduce energy use. Through this measure, the City will promote the voluntary incorporation of Energy Star and high-efficiency equipment and appliances in both residential and nonresidential development. The incremental costs of such equipment and appliances will be offset from utility and state rebates.

The City will also work with the Sacramento Metropolitan Air Quality Management District to encourage integration of high-efficiency equipment into industrial uses. The City will support integration of best performance standards for all new stationary engines, including reciprocating engines, natural gas reciprocating engines, and liquefied petroleum gas boiler engines. These activities provide power for a variety of industrial and commercial processes. Best performance standards yield higher operating efficiencies with less

comparative GHG emissions than standard equipment.

Action Items

- Provide educational information on the use of smart-grid-integrated appliances through the City's website and through plan review meetings.
- Encourage the use smart-grid and Enery Star appliances in new development.
- As applicable, work with the Sacramento Metropolitan Air Quality Management District to encourage all new industrial projects to install high-efficiency engines that comply with best performance standards.
- During plan review for nonresidential developments, work with SMUD and PG&E to promote the use of combined heat and power equipment or cogeneration, as applicable.
- Partner with SMUD and PG&E to promote the installation of variable-speed pool pumps and solar thermal pool heaters in new development.

BE-8. Community Forestry

Plant trees in appropriate densities and locations that will maximize energy conservation and air quality benefits.

Existing Efforts

EGMC 19.12

General Plan Policy CAQ-27, Policy CAQ-8,CWDG-3.A.2.20-21

With the help of local partners (e.g., Sacramento Tree Foundation), the City of Elk Grove has established a 40-year urban forest canopy goal and is developing an Urban Community Master Plan to meet that goal. This measure quantifies the goals and actions of the Community Forestry Master Plan and calls for stricter tree coverage requirements in new development. The City's zoning code (Title 23 of the Municipal Code) will be updated to require more trees in parking lots and on private property, with special attention to east and west sides of lots to maximize shading in the summer.

The SMUD and Sacramento Tree Foundation shade tree program allows Sacramento County residents to receive up to 10 free trees to plant at their home, business, school, or parking lot to shade the structure on the property.

The energy and GHG benefits of this measure result from increased shading on buildings and pavements. Increased shading results in lower urban temperatures, thus reducing the urban heat island effect.

Co-benefits of this measure include carbon sequestration, extended life of paved surfaces, improved water quality from trapping runoff, increased traffic safety, aesthetic improvements, increased real estate values, and increased sociological benefits.

Action Items

- Develop a Community Forestry Master Plan to include, but not be limited to, the following:
  - Best management practices for tree planning, planting, and maintenance;
  - Designatation of areas for preservation or future planting;
  - Shade requirements for new multi-family and nonresidential development;
  - Preferred tree list, and specifications for street trees;
  - Proper spacing, plant diversity, and planting requirements.
- Encourage participation in local shade tree giveaways, such as those provided by SMUD and the Sacramento Tree Foundation.
- Implement the City's Tree Preservation Ordinance.
- Provide funds for education, programs, and materials emphasizing the value and importance of trees. Support private foundations with local funds for their tree-planting efforts. Encourage the harvesting of native seeds and plants prior to the clearing of project sites.
- Update the City's design guidelines to ensure appropriate placement of street and accent trees as shade and seasonal climate control.

BE-9. Cool Paving Materials

Encourage the use of high-albedo material for future outdoor surfaces to the greatest extent feasible, including but not limited to parking lots, median barriers, roadway improvements, and sidewalks.

Increasing urban albedo can reduce summertime temperatures, resulting in better air quality and savings from reduced air-conditioning costs. Albedo is the measure of an object's reflectivity. Lighter-colored materials absorb less heat and therefore have a higher albedo ratio.

Increasing urban albedo reduces absorption of incoming solar radiation, countering some effects of increasing GHG concentrations. Pavements and roofs typically constitute over 60 percent of urban surfaces. Using reflective materials can increase both roof and pavement albedo by about 0.25 and 0.15, respectively, resulting in a net albedo increase of about 30 percent. To maximize the albedo of pavement, lighter-colored aggregate can be used in the pavement mix. Alternatively, asphalt pavements can be covered with high-albedo sealcoats, small rocks set in binder, or a thin layer of concrete. For concrete applications, using lighter-colored sand and cement can increase reflectivity. Cool (light-colored) pavements also increase nighttime visibility and pavement durability.

What is a high-albedo material?

Albedo is the ratio of the amount of solar radiation (heat) reflected from a surface to the total amount reaching that surface. A high-albedo material is one that reflects a significant amount of incoming solar heat. Materials that are light in color reflect this heat, rather than absorbing it. By contrast, a low-albedo material absorbs solar heat. An example of a low-albedo material is asphalt, as the dark color absorbs solar heat.

High-albedo paving materials include, but are not limited to, concrete, pavement resins, and painted asphalt.

This program encourages and facilitates the use of high-albedo material for future outdoor surfaces such as parking lots, median barriers, roadway improvements, and sidewalks. If the City finds through ongoing monitoring that the total paved surface areas using high-albedo pavements are falling short of the 2020 target, the City will consider additional voluntary and mandatory programs to achieve the targets outlined in this measure.

Action Items

- Use high-albedo materials in municipal facilities and capital improvement projects to the greatest extent feasible.
- Revise design guidelines to encourage the use of high-albedo materials in new development.

BE-10. On-Site Renewable Energy Installations

Promote voluntary installations of on-site solar photovoltaics in new and existing development, and revise standards to facilitate the transition to solar water heaters and solar photovoltaics in new development.

Existing Efforts

Builds on utility programs

EGMC 16.90.030

General Plan Policy H-9, and Policies CWDG-3.B.2.5 and CWDG-5.A.2.62

The goal of this measure is to reduce GHG emissions related to residential and commercial energy use by facilitating the development of small-scale distributed renewable energy production. Renewable energy installations are expected to increase dramatically throughout the next few decades due to innovative financing strategies, lower costs of renewable energy equipment, and new regulations that require the provision of solar photovoltaic options and solar offsets for new subdivisions. Furthermore, the City's climate is well suited for on-site solar installations. This measure would ensure that the Zoning Code (Title 23 of the Municipal Code) and applicable design guideline standards safely allow renewable energy installations within residential and commercial zones.

Building on SMUD's SolarSmart Homes program and developments in Elk Grove certified through SMUD's SolarSmart Homes program, the City will require new residential and nonresidential

development to provide solar photovoltaic prewiring. The City will continue to waive permit fees related to installations. In addition, the City will implement new incentives for renewable energy systems in nonresidential development greater than 25,000 square feet. Large nonresidential projects are more likely to benefit from on-site renewable energy systems due to higher volume of energy demand and greater potential for near-term payback. Subdivisions will also have to comply with statewide regulations established by the Homebuyer Solar Option, which requires all new developers of subdivisions to offer solar systems to customers or to pay into an offset system managed by the California Energy Commission.

Action Items

- Promote innovative private development projects in Elk Grove that have constructed SolarSmart Home projects, including Aria at Madiera by Lennar and Gardner Square by Centex.
- Partner with private developers and SMUD to encourage new developments to achieve certification through SMUD's SolarSmart Homes program, with standards including installation of a rooftop solar photovoltaic system, roofing with a radiant barrier, a 90 percent efficiency furnace, and high-efficiency air conditioning systems.
- Require new commercial, office, and industrial development to provide prewiring or conduit for solar photovoltaics, and incentivize nonresidential development greater than 25,000 square feet to provide renewable energy systems to support energy demand on site, including technologies such as solar photovoltaic systems.
- Require solar photovoltaic prewiring in all new residential development.
- Work with Sacramento County, SMUD, and private developers to prepare locally specific preapproved single-family plans for the SolarSmart Home program.
- Support implementation of the Homebuyer Solar Option for all subdivision projects, and encourage developers of new medium- and high-density residential projects to *supply 20 percent of projected electricity use of each building from ren*ewable resources.
- Continue to issue photovoltaic system permits at no charge upon SMUD's approval, and consider expanding this permitting incentive to apply to solar water heaters as well.
- Promote the Figtree PACE program to multi-family and commercial property owners, which provides low-interest financing for renewable energy system installations.
- Facilitate building siting for solar access and setbacks to allow for small-lot development.
- Update the Citywide Design Guidelines and the Zoning Code to remove impediments to the installation of renewable energy facilities and provide solar-ready building guidelines.

BE-11. Off-Site Renewable Energy
Encourage participation in SMUD's off-site renewable energy programs, which allow building renters and owners to choose locally produced cleaner electricity sources.

Existing Efforts

Builds on utility programs

Elk Grove residents and businesses have the opportunity to purchase electricity from local, renewable sources through two innovative SMUD programs: Greenergy and SolarShares. Leveraging these existing resources, the City of Elk Grove will actively promote SMUD's initiatives that allow local residents to achieve an electricity mix that is cleaner than the mandatory standards established by the Renewables Portfolio Standard. Through SMUD's SolarShares program, electricity customers can participate in a community program that allows renters and building owners to pay a monthly fee for electricity from a solar photovoltaic system. On each electricity bill, the participant receives energy credits based on the amount of solar power generated by the SolarShare in that billing cycle. This innovative program removes the upfront investment otherwise needed to install a solar system. Greenergy is a separate opt-in program that allows customers to pay SMUD a flat monthly fee for SMUD to supply 50 percent or 100 percent of electricity use with power from renewable sources, including wind, water, sun, and biomass.

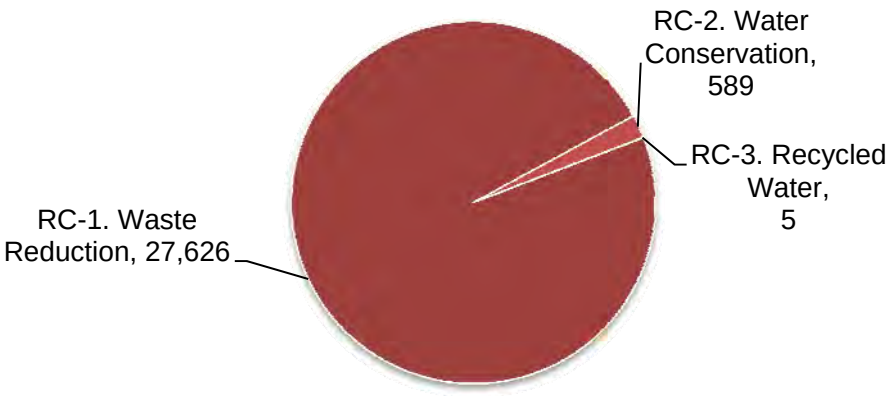
Action Items

- Promote participation in SMUD's Greenergy program, which allows all electricity customers to pay low monthly fees to meet electricity needs from either 50 percent or 100 percent renewable sources.
- Promote participation in SMUD's SolarShares program, which allows all account holders to pay a fixed monthly fee to purchase solar electricity produced on a local solar farm.
- Update the City's website and materials for residents and businesses to promote SMUD's affordable green electricity source options.
- Work closely with SMUD to conduct local outreach, events, and promotions for SMUD's clean energy programs.

Resource Conservation (RC)

Conservation of resources is a basic tenet of sustainability that also reduces GHG emissions. Both the consumption and disposal of resources requires energy and emits GHGs. For instance, emissions are generated by the energy used to transport and treat water, while emissions also result from the decomposition of resources that have been converted into waste. By reducing the consumption of such resources, the City is able to reduce its impact on GHG emissions while fostering environmental stewardship throughout the community.

Figure 4-4. *RC Greenhouse Gas Reductions by Measure in 2020 (CO_2e)*



GHG Reductions per Year (Metric Tons CO_2e)	
To Date:	-2,162
2020:	-28,221
2025:	-31,304
Responsible City Department/Public Agency	
Waste and Recycling, Planning, Building	
Cost to the City	
Medium	
Private Investment	
Medium	

SUPPORTING MEASURES FOR RESOURCE CONSERVATION (RC)

RC-1. Waste Reduction
The City shall facilitate recycling, reduction in the amount of waste, and reuse of materials to reduce the amount of solid waste sent to the landfill from Elk Grove and achieve an 80 percent diversion by 2020.

Existing Efforts

EGMC 30.70

General Plan Policies CAQ-25 and CWDG-5.A.2.35

The City of Elk Grove has already implemented several waste reduction programs for residents and businesses in Elk Grove. The City will continue to identify local and regional programs as they become available to increase the proportion of waste diverted from the landfill. The community of Elk Grove currently diverts 59 percent of its waste through recycling, composting, and green waste pickup.

Residents of Elk Grove are able to dispose of green waste, recyclable materials, and e-waste along with their normal garbage through the City's curbside pickup program. The City also hosts composting workshops for residents interested in converting their food scraps and yard waste into nutrient-rich soil.

Businesses in Elk Grove may have their food waste and grease picked up for a fee. The City has also created a business recycling ordinance (codified as EGMC 30.60), requiring businesses to provide appropriate recycling facilities, and training for employees.

In addition to the waste diversion programs, the City is creating a new waste transfer station, which will reduce the distance waste haulers currently travel to other transfer stations in Sacramento County.

Action Items

- Continue to provide curbside green waste opportunities for residents and businesses.
- Encourage and create incentives for the use of recycled concrete in all base material utilized in City and private road construction.
- Where required or feasible, storage and/or recycling centers should be incorporated into the initial site planning for nonresidential developments.
- Expand the current construction and demolition ordinance to require 65 percent waste diversion (Tier 1 CALGreen).
- Develop and implement an education campaign to encourage businesses to take an active role in recycling and composting, focusing on businesses that generate a large amount of compostable and/or recyclable waste.
- Monitor reycling services contracts to ensure that the range of materials accepted is consistent with the latest technology and best practices.

- Consider a policy to reduce or restrict the use of polystyrene foam (styrofoam) to-go containers.

RC-2. Water Conservation

Reduce the amount of water used by residential and nonresidential uses.

Existing Efforts

EGMC 14.10

General Plan Policies CAQ 1,; CWDG-3.A.2.4.a, and CWDG-3.B.2.17

To complete this measure, the City will rely on local actions by residents and water rationing by the local water districts. The City's water services are provided by the Elk Grove Water District and the Sacramento County Water Agency. The City shall partner with each water provider to further publicize these conservation efforts and educate residents to ensure achievement of reduction goals.

This measure relies on statewide averages in order to quantify the energy reductions that would result from conserved water use. The California Energy Commission estimates all total possible reductions for water use, including local programs and water conservation efforts.

With increased water efficiencies, not only will total kilowatt hours for transport of water be decreased, but the community's water supply will be better protected and preserved for future needs. Results from this measure are assumed to result from increased water efficiency community-wide and decreased overall water use, and do not include upgrades to infrastructure.

Action Items

- Implement the City's Water Conservation Ordinance.
- Actively encourage water conservation by both agricultural and urban water users.
- Work with urban and agricultural water purveyors to establish long-range conservation plans which set specific conservation objectives and utilize, to the extent possible, a common planning horizon, plan framework, and estimating/forecasting procedures.
- Promote the use of drought-tolerant vegetation to minimize water consumption by providing information to developers and designers.
- Encourage use of drought-tolerant planting and grading/improvement design to maximize runoff into designated planter areas.

RC-3. Recycled Water

Promote and remove barriers to the use of greywater systems and recycled water for irrigation purposes.

Using non-potable water for landscape and irrigation purposes is less energy-intensive than the process of treating and pumping potable water. Recycled water can be sent to the water treatment plant and then sent to properties with dual plumbing for irrigation purposes or the water can be treated on-site through the installation of a greywater treatment system. Using recycled

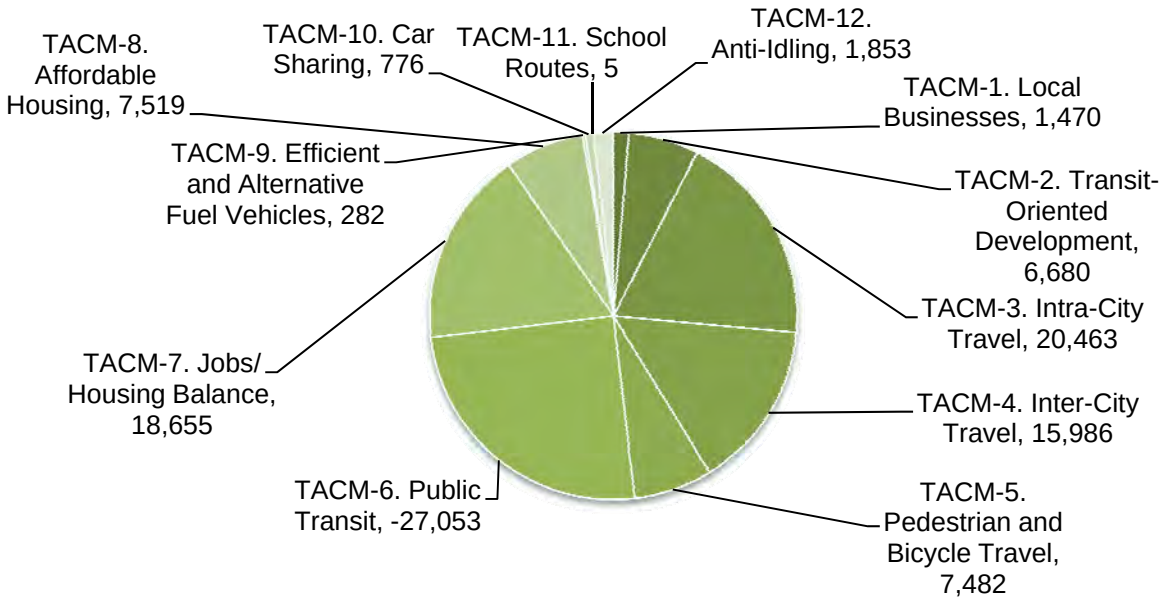
water will help to preserve the local water supply and reduce the amount of electricity needed to convey, pump, and treat the water used in households and businesses.

Action Items

- Update the municipal code to allow for residential greywater systems.
- Investigate the feasibility of using recycled water for public landscaping.

Transportation Alternatives and Congestion Management (TACM)

Figure 4-5. *TACM Greenhouse Gas Reductions By Measure In 2020*


TACM-8. Affordable Housing, 7,519
TACM-10. Car Sharing, 776
TACM-11. School Routes, 5
TACM-12. Anti-Idling, 1,853
TACM-1. Local Businesses, 1,470
TACM-9. Efficient and Alternative Fuel Vehicles, 282
TACM-2. Transit-Oriented Development, 6,680
TACM-3. Intra-City Travel, 20,463
TACM-7. Jobs/ Housing Balance, 18,655
TACM-4. Inter-City Travel, 15,986
TACM-6. Public Transit, -27,053
TACM-5. Pedestrian and Bicycle Travel, 7,482

GHG Reductions per Year (Metric Tons CO_2e)	
To Date:	-29,904
2020:	-108,221
2025:	-129,166
Responsible City Department/Public Agency	
Transit Services, Planning, Public Works	
Cost to the City	
High	
Private Investment	
High	

Land use patterns and transportation have a complex interrelationship. The distribution of land uses throughout a community shape transportation choices; in order to take part in the tasks of daily living, each day people must make choices about transportation that have direct impacts on GHG emissions. Likewise, transportation options and accessibility in turn shape daily lifestyle choices. Transportation is often the largest contributor of GHGs within a community and one of the most complex sectors to address. Economic considerations, political will, and other factors complicate actions to optimize land use and transportation options

The following measures investigate more specifically the connection between transportation and land use, and provide a strategy to wield it for the maximum benefit of residents while reducing the impact on GHG emissions.

SUPPORTING MEASURES FOR TRANSPORTATION ALTERNATIVES AND CONGESTION MANAGEMENT (TACM)

TACM-1. Local Goods

Promote policies, programs, and services that support the local movement of goods in order to reduce the need for travel.

Existing Efforts

General Plan Policies ED-6, ED-9, ED-11–12

Promoting commerce between local businesses and residents reduces the amount of travel required to meet the service needs of residents. Elk Grove's Think, Shop, Live campaign and the Fantastic Fridays program encourage participating businesses to host events and provide incentives or discounts to residents to shop at local and independently owned stores on the second weekend of every month. Elk Grove also has a weekly Farmers' Market, where residents can purchase food and produce from local farmers and reduce the distance that their food must travel.

Shopping locally increases the tax revenues that the City receives and can help to fund other emissions reduction programs.

Action Items

- Support efforts that encourage Elk Grove residents and businesses to buy goods and services locally.
- Support strategies to increase business-to-business commerce in Elk Grove.
- Create a program to recognize employers that contribute to the quality of life in the community.
- Actively promote revitalization and strong sales in Old Town Elk Grove and along major commercial thoroughfares.
- Assist local merchants and business organizations interested in forming mutual benefit organizations such as merchants associations and business improvement districts.
- Support strategies to increase business-to-business commerce in Elk Grove.

TACM-2. Transit-Oriented Development (TOD)

Support higher-density, compact development along transit by placing high-density, mixed-use sites near transit opportunities.

Existing Efforts

General Plan Policy H-3

This measure would ensure that new development is directed toward areas close to existing or proposed transit or bike thoroughfares in order to decrease Elk Grove's dependency on single-occupant vehicle trips. The measure would also allow new developments within transit-oriented areas to be built at higher densities and encourage a mix of commercial and residential uses.

Action Items

- Identify and designate opportunity areas for transit-oriented development.
- Change General Plan and zoning maps to include TOD opportunity sites.
- Review the TOD designation in the General Plan and Zoning Code (Title 23 of the Municipal Code) to revise the definition to include mixed-use, compact, higher density development around transit stops.

TACM-3. Intracity Transportation Demand Management

The City shall continue to implement strategies and policies that reduce the demand for personal motor vehicle travel for intracity (local) trips.

Existing Efforts

Builds on regional transit programs

EGMC 10.64

General Plan Policies C1-5, C1-6, C-15, CAQ-28, CAQ-29

Short Range Transportation Plan

The City of Elk Grove Transit Services has created a new transportation demand management program to reduce the dependence of Elk Grove residents and employees on personal vehicle travel. The City is developing partnerships with public and private employers in the City to work together in addressing local transportation and air quality issues. The goal of the program is to make Elk Grove a better place to live, work, and shop by promoting innovative solutions to parking, commuting, and air quality problems. Services provided include:

- Ridematching (carpools/vanpools/bicycling)
- Emergency ride home with a taxi or rental car
- Promotion of alternative transportation (walking, biking, public transit, or ride-sharing) to all residents
- Promotion of Sacramento Region 511 and other regional alternative transportation programs
- Management and maintenance of the Elk Grove/South Sacramento Commuter Club
- Outreach to employers about alternative transportation
- Technical assistance to employer transportation coordinators and employers in preparing a trip reduction plan or developing a transportation demand management program
- Information for residents and employees on transit routes and schedules, bicycle and pedestrian trails, paths, and routes, rideshare programs, and opportunities for telecommuting
- Promotion of best workplaces for commuters
- Business attraction and retention program that promotes the City's transit services

The program aims to reduce local commute traffic by 20 percent, which is equivalent to each person taking alternative transportation modes once a week. More information can be found on the City's website at http://www.e-tran.org/commuter-alternatives.asp.

Action Items

- Implement policies and actions in the General Plan Conservation/Air Quality Element which seek to encourage non-vehicular transportation alternatives in Elk Grove.

- The City shall support positive incentives such as carpool and vanpool parking, bus turnouts, and pedestrian-friendly project designs to promote the use of transportation alternatives.
- The City shall participate in the preparation and implementation of a Congestion Management Plan consistent with legal requirements, which gives priority to air quality goals, alternatives to automobile travel, and the development of demand reduction measures over additional road capacity.
- Implement the requirements for designated carpool and vanpool parking for all new office developments and update standards to meet vehicle miles traveled (VMT) reduction targets.
- Facilitate SACOG's partnership with community and employer organizations that is intended to support proactive and innovative transportation demand management programs covering all parts of the urbanized area, to offer a variety of choices to driving alone.
- Continue to implement trip reduction programs for businesses with 100 or more employees.
- Consider expanding the standards for trip reduction permits.
- Adopt a standard for shopping center carpool parking spaces near store entries to encourage multiple occupant vehicle visitors.

TACM-4. Intercity Transportation Demand Management

The City shall support and contribute to regional efforts to reduce demand for intercity (regional) personal vehicle travel.

Existing Efforts

Builds on regional transit programs

General Plan Policies CI-7–8, C1-26

As part of the larger Sacramento region, the City must account for intercity travel to, from, and through the City. The Sacramento region is a leader in regional land use and transportation planning through development of the 2030 Sacramento Regional Blueprint and corresponding Metropolitan Transportation Plan (MTP). The MTP is a 28-year plan for transportation improvements in the region, such as bus rapid transit, commuter rail, high occupancy vehicle lanes, and highway improvements. This measure calls for the City to support regional initiatives such as those in the MTP that provide alternative transportation options appropriate for longer distance travel. It also calls for the City's continued support of flexible work schedules, telecommuting, and carpooling within the region.

Action Items

- The City shall encourage commuter rail transportation by providing for a potential train station location for Amtrak and/or other rail service providers along the Union Pacific

railroad near the southwest of the intersection of Sheldon Road and Elk Grove-Florin Road.

- Light rail service in Elk Grove shall be designed to serve major employment centers and the future regional mall at Kammerer Road/State Route 99.
- Support regional programs, including SACOG's Bike Commute Month, SACOG's 511 Brochures, SACOG's regional vanpool incentive program, www.sacregion511.org, and SACOG's joint park-and-ride lots, in addition to the Sacramento Region Commuter Club and e-tran.
- Encourage the use of flexible work schedules and telecommuting in new businesses that locate in the area.

TACM-5. Pedestrian and Bicycle Travel

Provide for safe and convenient pedestrian and bicycle travel through implementation of the Bicycle and Pedestrian Master Plan and increased bicycle parking standards.

Existing Efforts

General Plan Policy CI-5

The City's Bicycle and Pedestrian Master Plan was completed in 2004 and details the City's anticipated future bikeways and bike and pedestrian facility improvements. As of 2010, the City had installed 6.5 miles of bikeways since the 2005 baseline year. This measure quantifies the increase in the number of trips made by bicyclists and pedestrians based on existing and planned improvements in bike and pedestrian infrastructure outlined in the Bicycle and Pedestrian Master Plan and the Trails Master Plan. Trips made by biking or walking are assumed to replace a trip that would have been made by a single occupant in a vehicle.

Action Items

- Commercial parking standards will be revised to require a ratio of one bicycle parking space per 20 vehicle parking spaces. Multi-family parking standards will be revised to require one long-term bicycle storage space per unit. Storage options may include a multitude of options that provide secured storage.
- Standards will be revised to require the provision of bicycle support facilities (lockers, shower rooms, etc.) for appropriate development.
- New multi-family development developed by the target years will be characterized by internal and off-site pedestrian and bicycle connections that are in excess of those called for in the Bicycle and Pedestrian Master Plan.
- Ensure that applications for new office and mixed-use development analyze the project's connection and orientation to pedestrian paths, bicycle paths, and existing transit stops within 1/2 mile of the project site. To the extent feasible, the project should be oriented toward an existing transit, bicycle, or pedestrian corridor with minimum setbacks. Exceptions may be considered for site-specific project constraints or projects that support equivalent pedestrian, bicycle, or

alternative transportation through other methods.

- Require applications for new office and mixed-use development to minimize setbacks from the street and provide pedestrian pathways. City staff shall work with project applicants to ensure that entrance locations and parking lot designs encourage pedestrian access and safety, using design features such as clearly marked and shaded pedestrian pathways between transit facilities and building entrances.
- Encourage pedestrian-oriented plazas, walkways, bike trails, bike lanes, and street furniture and connections to other community areas.
- Promote pedestrian convenience and recreational opportunities through development conditions requiring sidewalks, walking paths, or hiking trails connecting various land uses and including safety amenities such as lighting and signage.

TACM-6. Public Transit

Continue to improve and expand transit services for commuters and non-commuters traveling within Elk Grove and regionally, providing the opportunity for workers living in other areas of Sacramento County to use all forms of public transit—including bus rapid transit and light rail—to travel to jobs in Elk Grove, as well as for Elk Grove residents to use public transit to commute to jobs outside the City.

Existing Efforts

General Plan Policy CAQ-29

e-tran Short Range Transit Plan

In 2005, the City approved an e-tran Short Range Transit Plan outlining ways in which to improve and expand local public transit. From 2005 to 2008, the City saw a 108 percent increase in the amount of passenger-miles traveled on its regional and local e-tran lines. The City anticipates that public transit use will only grow as highway and local road congestion increases.

Action Items

- Expand and improve commuter services to reduce overcrowding on existing routes and entice more residents to ride transit rather than drive alone.
- Create broader coverage and mobility goals, in addition to productivity goals, in order to create a basic mobility network throughout the City.

- Increase the number of bus shelters provided through the citywide bus shelters program.
- Consider implementation of a development impact fee to provide funding for the development of new public transit facilities and rolling stock expansion in Elk Grove .

TACM-7. Jobs/Housing Balance

Continue to improve Elk Grove's jobs/ housing ratio and seek to achieve sufficient employment opportunities in Elk Grove for all persons living in the City.

Existing Efforts

General Plan Policy ED-7

Elk Grove's jobs/housing balance refers to the match between both the type and quantity of housing opportunities and job opportunities within an area. A better jobs/housing balance means that Elk Grove residents will have employment opportunities available near their home, and Elk Grove employees will have housing opportunities near their work. A better jobs/housing balance will reduce the amount of time it takes to commute to work, thus reducing VMT and congestion.

Action Items

- Continue to expand opportunities for economically sustainable, job-creating uses in the City.
- Continue to pursue innovative public-private partnerships that will spur job creation, such as the Civic Center partnership and work with the Chamber of Commerce, and use the Economic Development Coordinator for enhanced efficiency and coordination that will result in maximum job creation for the community.
- Implement the Think, Shop, Live Elk Grove program to encourage residents and businesses to shop locally and spur local economic activity.
- Continue to implement incentive programs that spur the creation and/or retention of jobs with salaries equal to at least 75 percent of area median income.

TACM-8. Affordable and Senior Housing

Continue to promote and require the development of affordable and senior housing in Elk Grove.

Existing Efforts

General Plan Housing Element

A significant amount of evidence points to the fact that lower-income households and senior citizens own fewer vehicles and drive less. Furthermore, affordable housing ensures an equitable and just community in which people of all income levels can live in Elk Grove.

The 2008 Housing Element Update provides for over 2,600 affordable units to be constructed by 2013. Given the housing market at the time of this Plan's adoption, this measure provides a conservative estimate for the reduction in VMT

and associated GHG emissions resulting from increased affordable housing in Elk Grove.

Action Items

- Provide for affordable housing development in Elk Grove consistent with the goals and actions of the Housing Element.

TACM-9. Efficient and Alternative Vehicles

Promote alternative fuels and efficient vehicles throughout the community.

Existing Efforts

General Plan Policy CAQ-33

This measure achieves reductions in VMT by facilitating the use of electric vehicles by providing charging stations with new development. In order to achieve these reductions, the City will need to ensure the provision of charging stations consistent with the rate of adoption of electric vehicles. The City anticipates the need for as many as 300 stations by 2025 at a rate of approximately 20 per year. This measure quantifies the increased use of electric vehicles based on the number of charging stations installed by the City or private corporations for public use.

To increase the use of compressed natural gas (CNG) vehicles, Elk Grove has partnered with Clean Energy, a private corporation, to create a CNG fast-fuel station in the City. The station will be used by the City's transit fleet and will be available for private fleet vehicle use.

Action Items

- The City will install electric vehicle charging stations in new and existing civic facilities.
- Require new commercial construction over a certain size to be determined by City staff to provide an electric vehicle charging station and new residential construction to pre-wire for plug-in electric vehicles.
- Expedite the permit process for existing commercial and residential properties seeking to provide for electric vehicle recharging.
- Provide for the use of Neighborhood Electric Vehicles.
- Work with SMUD and local car dealers to track the demand and market absorbtion for electric vehicles and track residenital station installation through building permit issuance.

TACM-10. Car Sharing

Promote the use of vehicles and transportation options other than single-occupant vehicles.

This measure achieves reductions in VMT by getting more workers community-wide to participate in ride-sharing programs.

Action Items

- Continue to develop transportation demand management strategies for employers in Elk Grove through the use of the City's employee transportation coordinators.
- Continue to partner with and encourage region-wide reductions through the Sacramento Region Commuter Club and the

use of SACOG park-and-ride lots and vanpool incentives.

- Work with private entities to implement a citywide car-sharing program.

TACM-11. Safe Routes to School

Implement SACOG's Safe Routes to School policy.

Existing Efforts

Builds on regional SACOG programs

Elk Grove will actively promote walking as a safe mode of local travel, particularly for children attending local schools, by employing traffic calming methods such as median landscaping and provision of bike or transit lanes to slow traffic, improving roadway capacity, and addressing safety issues. This measure is intended to quantify the local impacts of a region-wide (SACOG) Safe Routes to School program.

According to the most recent census data, approximately 34,415 school-age children lived in Elk Grove (ages 6–18).[1] Until a few decades ago, most grade-school students walked or bicycled to school. Now, only a small portion (typically about 20 percent) walk or bicycle to school in North American communities. Travel to school represents 10–15 percent of peak period motor vehicle trips in many urban areas. Chauffeuring children to school often results in two vehicle trips, one to the school and one returning home, or four additional trips per day. There are currently few detailed studies of the effectiveness of school transport management programs, but anecdotal evidence indicates that total reductions in automobile trips of 10–20 percent or more are possible at a particular school, and much greater reductions are possible when schools are sited and designed for good accessibility.

School transport management can provide financial savings to schools and parents, help reduce parking and traffic problems, reduce pollution, and provide safety and health benefits.

Action Items

- Support SACOG in the development of a Safe Routes to School program.
- The City will utilize leveraged resources and implement the SACOG program through local infrastructure improvements and outreach programs.

[1] ACS 2007.

TACM-12. Traffic Calming and Anti-Idling
Improve traffic flow and reduce unnecessary idling through use of traffic calming devices and enforcement of idling restrictions.

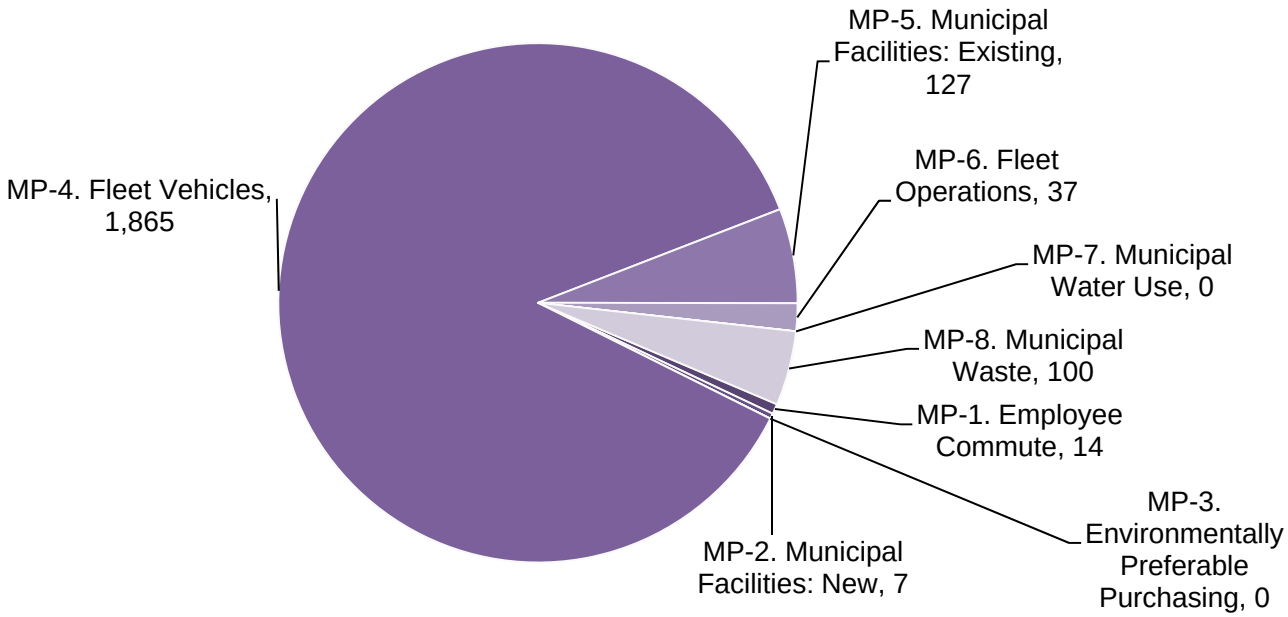
The goal of this measure is to reduce GHG emissions from transportation sources by reducing idling times and improving traffic flow. Under this measure, the City will continue to synchronize traffic signals along major corridors and arterials to reduce the amount of idle time at intersections. The City will also make an effort to use traffic calming devices that slow speeds, lead to safer pedestrian environments, and reduce GHG emissions.

Action Items

- Continue to synchronize traffic signals along major corridors and adjust synchronization on a regular basis to accommodate traffic patterns.
- Encourage traffic circles over 4- or 2-way stop signs at residential intersections, where feasible.
- Work with the police department to enforce vehicle idling limitations for commercial and construction vehicles, and buses pursuant to state law.
- Work with local schools to encourage guardians and caretakers to shut off their engines when waiting to pick up children from school.

Municipal Programs (MP)

Figure 4-6. *MP Greenhouse Gas Reductions by Measure in 2020*


MP-5. Municipal Facilities: Existing, 127
MP-6. Fleet Operations, 37
MP-4. Fleet Vehicles, 1,865
MP-7. Municipal Water Use, 0
MP-8. Municipal Waste, 100
MP-1. Employee Commute, 14
MP-3. Environmentally Preferable Purchasing, 0
MP-2. Municipal Facilities: New, 7

GHG Reductions per Year (Metric Tons CO_2e)	
To Date:	-94
2020:	-2,149
2025:	-3,604
Responsible City Department/Public Agency	
City Manager's Office	
Cost to the City	
Medium	
Private Investment	
Low	

Municipal emissions account for a small subset of overall community-wide emissions, and therefore municipal measures alone are not sufficient to achieve the comprehensive bulk of the City's targets. However, the City can utilize its control over internal operations to showcase itself as a leader in achieving GHG emissions reductions and lead by example.

SUPPORTING MEASURES FOR MUNICIPAL PROGRAMS (MP)

MP-1. Employee Commute
Establish an employee incentive program to encourage the use of transportation alternatives.

Provide incentives to City employees for carpooling or using alternative forms of transportation that will reduce the number of employees making single-occupant vehicle trips to and from work.

Action Items

- Provide incentives to employees for the use of transportation alternatives.

MP-2. Municipal Facilities: New
All City facilities shall incorporate energy-conserving design and construction techniques.

Existing Efforts

General Plan Policy CAQ-26

As Elk Grove continues to grow in population, the City will need to construct additional facilities to meet the governmental, social, and recreational needs of its citizens. Requiring each new City facility to comply with green building guidelines like LEED will reduce the energy needs of new facilities. New facilities that are constructed using green building techniques will provide the City with cost savings, serve as an example of green building practices to residents and businesses, and improve the health and comfort of the building occupants.

The City has plans to construct a new Civic Center in the years to come; however, the design and size of the buildings have not been determined. As a result, this measure does not include an estimate of the green building benefit of a future Civic Center site. Rather, it includes the GHG reductions from green building practices in facilities constructed or under construction since 2005.

Action Items

- Identify opportunities to achieve energy conservation in new municipal facilities using green building standards such as CALGreen or LEED.

MP-3. Fleet Vehicles
Adopt a policy to incrementally upgrade the vehicle fleet.

Existing Efforts

General Plan Policy CAQ-31

Incrementally converting the City's vehicle fleet from petroleum-based vehicles to alternatives like hybrids, CNG vehicles, or electric vehicles will reduce emissions related to vehicle fuel combustion.

Action Items

- The City shall consider pollutant emissions as one criterion for vehicle purchasing decisions, seeking to purchase lower-emitting vehicles.
- Purchase alernative and/or hybrid vehicles when feasible, with the overall goal of 12–15 percent alternative/hybrid by 2020.

MP-4. Environmentally Preferable Purchasing

Implement a consolidated and comprehensive environmentally preferable purchasing effort.

The City will provide a preference or incentives to service providers, vendors, and contractors who follow climate-friendly practices, such as the use of recycled content materials, Energy Star, or equivalent materials and equipment, as well as alternative fuel vehicles. The City's current policy allows a 5 percent increase in costs for the purchase of environmentally preferable products.

MP-5. Municipal Facilities: Existing

Implement the recommendations of the City's energy audits.

Elk Grove has conducted energy audits of existing City facilities to determine the baseline energy use of each facility and identify measures that can be implemented to reduce energy use. Motion sensors have been placed in some facilities to turn lights off in rooms when not in use.

MP-6. Fleet Operations

Efficiently use and maintain existing vehicles.

Proper vehicle maintenance can increase the fuel efficiency of vehicles and reduce emissions related to fuel combustion. Regular maintenance will also extend the life cycle of City fleet vehicles and reduce costs associated with vehicle purchases.

Action Items

- Establish a mandatory vehicle maintenance schedule to ensure optimal performance and maximized life cycle.

MP-7. Municipal Water Use

Improve the efficiency of municipal water use through retrofits and employee education.

Retrofits to water fixtures in City facilities reduce the amount of water used in sinks, irrigation, toilets, and other water appliances. Combined with employee and user education, the reduction in water use from these retrofits will decrease the electricity needed to pump and treat the water.

MP-8. Municipal Waste

Reduce municipal waste through employee education and environmentally preferable purchasing.

Municipal waste is generated at each facility, including parks and public facilities. Reducing the waste generated by these facilities through recycling and other diversion programs will reduce the hauling of loads to and from the transfer station and the methane released once the waste is landfilled.

The City has implemented an educational program for employees on appropriate waste and recycling protocols and has provided employees with recycling bins at each desk.

Conclusion and Next Steps

Reducing greenhouse gas emissions by 15 percent below 2008 levels in the next decade will be a significant task. This chapter outlines ways for the City to monitor progress toward that target and see that the Plan's goals, measures, and actions are implemented in a timely manner.

Plan Implementation and Integration

For this Plan to be successful, it must be integrated with regional and local plans and operations. This strategy will serve as a living document that will be updated on a regular basis to incorporate new programs and emissions reduction strategies as they are developed and as technological advancements are made. The CAP's relationship to the General Plan Sustainability Element gives the CAP a tie to all new development in the City. As the City moves forward with zoning code (Title 23 of the Municipal Code) updates, specific plans, housing elements, and other planning documents, staff will make sure that these documents support and are consistent with the CAP. City staff will implement the CAP through ongoing planning activities, programs, and the discretionary review process. As part of implementation, City staff will develop tools such as a checklist to identify all mandatory and voluntary CAP measures for development projects.

Furthermore, as a programmatic tiering document under the California Environmental Quality Act (CEQA), the CAP will be the City's one-stop shop for greenhouse gas analysis and mitigation under CEQA. Although this CAP identifies numerous mandatory and voluntary measures, the City will ensure appropriate use of the CAP for CEQA streamlining by maintaining the prerogative to use both mandatory and voluntary measures in this CAP as standards for new development, as appropriate. The City will work with applicants on a project-by-project basis to determine appropriate use of the CEQA benefits of the CAP, identifying appropriate mandatory and voluntary measures to integrate into project design or mitigation.

For developments wishing to benefit from CEQA streamlining provisions, the City may require measures in this CAP as mandatory conditions of approval or as mitigation in a mitigated negative declaration or an environmental impact report, as appropriate, on a project-by-project basis. This approach allows the City to ensure that new development can benefit from CEQA streamlining provisions while also ensuring that the City is on target to achieve the reduction targets outlined in this Plan. Plan Implementation

CAP implementation also requires strong leadership. The City will designate a staff person to conduct annual monitoring and reporting on implementation of CAP measures and overall progress toward CAP reduction targets. Lastly,

successful implementation requires regular monitoring and reporting. The City is committed to monitoring the CAP's implementation progress on an annual basis and reporting to the City Council on the CAP's progress on an annual basis. If the City determines during annual review that the City is falling short of reduction targets, the City will investigate the need to create additional voluntary and mandatory measures to attain the City's overall reduction goals. The City is also committed to updating the inventory, forecast, and reduction measures a minimum of once every five years. .Development of an implementation and monitoring tool will assist in tracking progress. The following policies are presented to ensure the City is successful in the implementation of the CAP.

IMPLEMENTATION MEASURES

The City is committed to the following implementation measures as the path to achieve the target 15 percent reduction below 2005 levels by 2020.

Implementation Measure 1: Monitoring

Annually monitor and report the City's progress toward achieving the reduction target.

Action Items

- Action 1.1: Facilitate implementation of measures and actions related to municipal operations.
- Action 1.2: Provide support to City staff to facilitate implementation of measures and actions.
- Action 1.3: Prepare an annual progress report for review and consideration by the City Council, Planning Commission, and other applicable advisory bodies.
- Action 1.4: Develop and utilize a monitoring and reporting tool to assist with annual reports, which will include an implementation matrix for consolidated tracking and reporting on measure-by-measure progress.
- Action 1.5: Identify key staff responsible for annual reporting and monitoring.
- Action 1.6: Integrate the results of the annual monitoring and reporting into the General Plan annual report or other annual monitoring exercises.

Implementation Measure 2: Update GHG Inventory and Plan

Update the baseline greenhouse gas emissions inventory and Climate Action Plan at a minimum every five years.

Action Items

- Action 2.1: Inventory 2010 GHG emissions no later than 2017.
- Action 2.2: Update the Climate Action Plan no later than 2017 to incorporate new technology, programs, and policies to reduce GHG emissions.
- Action 2.3: Should the annual reporting and monitoring actions (Actions 1.1 through 1.6) identify that the reduction measures included herein are not collectively meeting the GHG reduction goal of 15% by 2020, Planning Department staff shall prepare and present to the City Council recommended revisions to the CAP that would modify or replace measures to the extent necessary to achieve the GHG reduction goal of 15%.

Implementation Measure 3: Collaborative Partnerships

Continue to develop partnerships that support implementation of the Climate Action Plan.

Action Items

- Action 3.1: Continue formal memberships and participation in local and regional organizations that provide tools and support for energy efficiency, energy conservation, greenhouse gas emissions reductions, adaptation, education, and implementation of this Plan, including the Sacramento Municipal Utility District (SMUD), the Sacramento Metropolitan Air Quality Management District (SMAQMD), and other jurisdictions in the Sacramento region.

Implementation Measure 4: Funding Sources

Secure necessary funding to implement the Climate Action Plan.

Action Items

- Action 4.1: Identify funding sources for reduction measures as part of annual reporting.
- Action 4.2: Ensure implementation through the inclusion of emissions reduction and adaptation measures in department budgets, the capital improvement program, and other plans as appropriate.
- Action 4.3: Pursue local, regional, state, and federal grants as appropriate to support implementation.

Monitoring and Updating this Plan

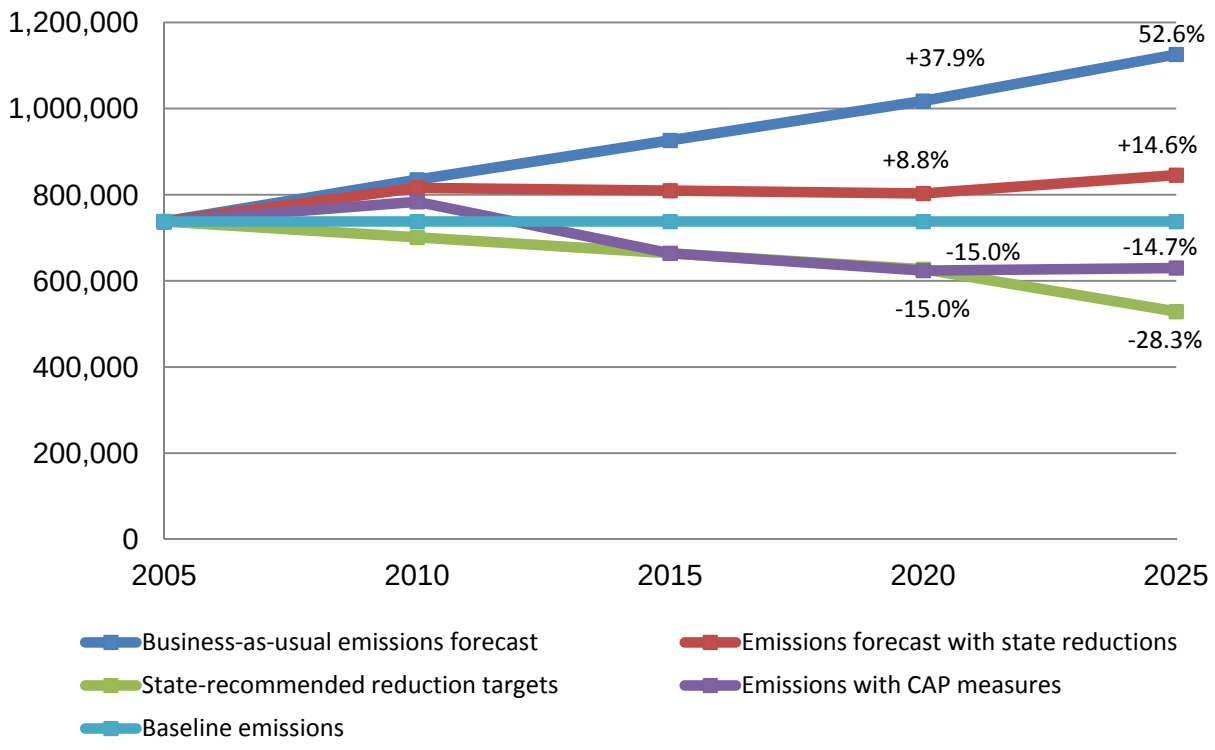
The City will develop a monitoring and reporting tool with an implementation matrix to track, monitor, and update the CAP. As the City reports on progress in implementing the CAP, staff will evaluate the effectiveness of each measure to ensure that the anticipated GHG reductions are occurring. In the event that GHG reductions do not occur as expected, the City will be able to

modify and add further policies to the CAP to ensure the City meets the local reduction target.

Outcome of the Climate Action Plan

The CAP outlines ways in which the City will be able to reduce greenhouse gas emissions by 15 percent below 2005 levels by 2020 and set the path for reductions in line with 2050 State emission reduction goals set forth in Governor's Order S-03-05 (see Figure 5-1). This significant effort not only makes the City compliant with State-recommended targets, but also creates a safer, healthier, sustainable, and more economically viable City.

Figure 5-1. *Elk Grove Climate Action Plan GHG Summary ($MTCO_2e$)*



Glossary of Terms

This section includes an explanation or description of terms used throughout the Climate Action Plan.

1. Adaptation: Adaptation refers to adjustments in natural or human systems to reduce vulnerability to climate change and global warming.

2. Baseline: The first year a greenhouse gas inventory is completed; a calculated level of emissions against which future inventories can be compared.

3. Composting: A process by which organic materials such as yard waste, grass, tree trimmings, fruit, and sometimes meat products and sewage sludge are converted to fertilizer through controlled decomposition.

4. Density: The number of people within one unit of land, often expressed in the number of dwelling units per acre.

5. Greywater or gray water: Greywater is wastewater generated from domestic activities such as laundry, dishwashing, and bathing which can be recycled on-site for uses such as landscape irrigation, and constructed wetlands.

6. Light-emitting diode (LED): LEDs, a semiconductor light source, use less energy and have a longer life than incandescent light bulbs.

7. Land use: The manner in which a parcel of land is used or occupied.

8. Metric ton: A metric ton is slightly smaller than a short ton, equal to about 1.1 short tons or 2,205 pounds.

9. Mixed-use: Development that includes a mix of uses in one area within close proximity, such as residential, commercial, and/or business.

10. Open space: Open space includes land that is used for recreation, farm land, and land that is not developed.

11. Transit-oriented development (TOD): The development of housing, commercial space, services, and job opportunities in close proximity to public transit nodes.

12. Transportation demand management (TDM): Transportation demand management or travel demand management (both TDM) is the application of strategies and policies to reduce travel demand (specifically that of single-occupancy private vehicles), or to redistribute this demand in space or in time.

13. Renewable energy: Energy from non-fossil fuel sources like solar, wind, tidal, and biogas.

14. Zoning: Zoning is a device of land use regulation used by local governments in most developed countries. The word is derived from the practice of designating permitted uses of land based on mapped zones which separate one set of land uses from another.

Works Cited

American Council for an Energy-Efficient Economy. 2010. Consumer Resources. Air Conditioning. http://www.aceee.org/consumer/cooling.

California Air Resources Board (CARB). 2010a. Climate Change Impact on Air Quality in California. Principal Investigator: Michael J. Kleeman, Ph.D. Air Pollution Research Reports/Studies. 04-349. http://www.arb.ca.gov/research/apr/past/climate.htm.

———. 2010b. Local Government Operations Protocol Version 1.1. http://www.arb.ca.gov/cc/protocols/localgov/pubs/lgo_protocol_v1_1_2010-05-03.pdf.

California Air Resources Board, California Climate Action Registry, and ICLEI. 2008. Local Government Operations Protocol Version 1.0. http://www.theclimateregistry.org/resources/protocols/local-government-operations-protocol/

California Climate Change Center. 2006. Our Changing Climate: Assessing the Risks to California. http://www.energy.ca.gov/2006publications/CEC-500-2006-077/CEC-500-2006-077.PDF (accessed December 3, 2008).

California Department of Resources Recycling and Recovery (CalRecycle). 2010. Alternative Daily Cover Basics. http://www.calrecycle.ca.gov/lGCentral/Basics/ADCBasic.htm.

California Department of Water Resources. 2006. Progress on Incorporating Climate Change into Management of California's Water Resources. Technical Memorandum Report.

———. 2008. Managing an Uncertain Future: Climate Change Adaptation Strategies for California's Water. http://www.water.ca.gov/climatechange/docs/ ClimateChangeWhitePaper.pdf

California Energy Commission (CEC). 2009. Refining Estimates of Water Related Energy Use in California, 2006. http://www.energy.ca.gov/pier/project_reports/CEC-500-2006-118.html.

California Natural Resources Agency. 2009. 2009 California Climate Adaptation Strategy: A Report to the Governor of the State of California in Response to Executive Order S-13-2008.

City of Elk Grove. 2003. General Plan Background Report. City of Elk Grove Planning. http://www.egplanning.org/gp_zoning/background_report/background_report.asp.

———. 2010. Interoffice Memorandum: Greenhouse Gas Emissions Inventory Peer Review and Update, dated April 19.

ICF Jones & Stokes. 2009. GHG Emissions Inventory for Incorporated and Unincorporated Sacramento County. (ICF J&S 00310.08). Sacramento, CA. Prepared for: Sacramento County Department of Environmental Review. http://www.airquality.org/climatechange/SAC_GHG_Inventory June09.pdf.

Intergovernmental Panel on Climate Change (IPCC). 2007. Contribution of Working Groups 1, II, and III to the Fourth Assessment Report of the Intergovernmental Panel on Climate Change. http://www.ipcc.ch/publications_and_data/ar4/syr/en/contents.html.

———. 2010a. IPCC statement on the melting of Himalayan glaciers. http://www.ipcc.ch/pdf/presentations/himalaya-statement-20january2010.pdf

———. 2010b. Statement on IPCC principles and procedures. http://www.ipcc.ch/index.htm.

———. 2010c. An Open Letter from Scientists in the United States on the Intergovernmental Panel on Climate Change and Errors Contained in the Fourth Assessment Report: Climate Change 2007. http://www.openletterfromscientists.com/.

Monahan, William B., and Gary Langham. 2009. Curbing Greenhouse Gas Emissions Will Reduce Future California Bird Loss. Conservation Science Policy Brief: Audubon California.

National Aeronautical and Space Administration (NASA). 2009. Facts Online. http://www.gsfc.nasa.gov/gsfc/service/gallery/fact_sheets/earthsci/green.htm.

Next 10. 2010. California Green Innovation Index. http://www.next10.org/environment/greenInnovation10.html.

Sacramento Municipal Utility District (SMUD). 2012. Rebates, Incentives, and Financing. Pool Pumps https://www.smud.org/en/residential/save-energy/rebates-incentives-financing/documents/pool-spa-brochure.pdf.

United Nations Environmental Programme (UNEP). 2010. Climate Change Press Release, 23rd of February. http://www.unep.org/climatechange/News/PressRelease/tabid/416/language/en-US/Default.aspx ?DocumentID=612&ArticleID=6472&Lang=en.

US Department of Energy (DOE). 2010. Energy Efficiency and Conservation Block Grant Program. Weatherization and Intergovernmental Program. http://www1.eere.energy.gov/wip/eecbg.html.

City of Elk Grove GHG Inventory and Forecast

Background

In June 2009, the Sacramento County Department of Environmental Review and Assessment completed the Greenhouse Gas Emissions Inventory for Sacramento County. The Inventory included government and community-wide emissions inventories for the unincorporated county and cities of Citrus Heights, Elk Grove, Folsom, Galt, Isleton, Rancho Cordova, and Sacramento. The Inventory used the baseline year of 2005 to maintain consistency with other agencies throughout the state as well as with California's Assembly Bill 32.

The City is currently in the process of developing a Climate Action Plan, which will be a road map to reducing community-wide and municipal emissions. The Climate Action Plan relies on the Inventory as a baseline against which we can measure future progress and growth. As such, it is important that the baseline inventory be as accurate and up to date as possible in order to streamline the Climate Action Plan analysis.

This review is not intended to be a formal revision or addendum to the adopted inventory developed by SACOG. This review presents a new approach to the City Inventory for the purposes of the Climate Action Plan. This review also includes two options for an emissions forecast, which will be used to calculate future reductions in emissions. The "business-as-usual" forecast is an estimate of how future emissions will grow with population, housing, and job growth in the City if no action is taken to reduce current consumption trends. A forecast was not included in the original inventory.

CITY OPERATIONS INVENTORY REVIEW AND RECOMMENDED UPDATES

Staff found that the municipal inventory adhered strictly to the Local Government Operations Protocol v1.0 developed by the Air Resources Board. It does not warrant any change.

COMMUNITY-WIDE INVENTORY REVIEW AND RECOMMENDED UPDATES

The City of Elk Grove citywide (hereafter referred to as community-wide) inventory calculated greenhouse gas emissions resulting from activity within the geopolitical boundary of Elk Grove in calendar year 2005. Unlike municipal greenhouse gas (GHG) inventories, California has not adopted a protocol for community-wide greenhouse gas emissions analysis. Inventories instead rely on best practices and a draft

international protocol named the International Local Government GHG Emissions Analysis Protocol (IEAP) version 1.0 developed by ICLEI – Local Governments for Sustainability.

The IEAP recommends that community-wide inventories at the local government level adhere to the following principles:

- **Relevance:** The greenhouse gas inventory shall appropriately reflect the greenhouse gas emissions of the local government or the community within the local government area and should be organized to reflect the areas over which local governments exert control and hold responsibility in order to serve the decision-making needs of users.
- **Completeness:** All greenhouse gas emissions sources and activities within the chosen inventory boundary shall be accounted for if data is available. Any specific exclusion should be disclosed.
- **Consistency:** Consistent methodologies to allow for meaningful comparisons of emissions over time shall be used. Any changes to the data, inventory boundary, methods, or any relevant factors in the time series shall be disclosed.
- **Transparency:** All relevant issues shall be addressed in a factual and coherent manner to provide a clear audit trail, should auditing be required. Any relevant assumptions shall be disclosed and include appropriate references to the accounting calculation methodologies and data sources used, which may include the IEAP protocol and any relevant supplements.
- **Accuracy:** The quantification of greenhouse gas emissions should not be systematically over or under the actual emissions. Accuracy should be sufficient to enable users to make decisions with reasonable assurance as to the integrity of the reported information.

Staff reviewed the City's community-wide inventory for consistency with these principles as well as best practices among California local government greenhouse gas inventories. Staff also updated the Inventory with new transportation data developed by the County in fall 2010. Staff's inventory review recommends that the following actions be taken to update the City's GHG Inventory for the purposes of the Climate Action Plan:

- **Residential energy** – Omit greenhouse gas emissions associated with residential wood burning due to lack of accuracy and consistency in appropriating emissions to Elk Grove relative to other communities.
- **Commercial and industrial energy** – No change.
- **Industrial specific** – No change.
- **On-road transportation** – Update with new vehicle miles traveled (VMT) numbers provided by the County to be consistent with the VMT appropriation method recommended by the state through Senate Bill (SB) 375 implementation.

- **Off-road equipment and vehicles** – Omit off-road emissions from the Inventory for lack of accuracy and consistency in appropriating countywide emissions for each jurisdiction. Include off-road emissions from agricultural off-road emissions, which will be appropriated based on the percentage of farmland in the City compared to the rest of Sacramento County.
- **Waste** – Exclude waste-in-place emissions from the GHG Inventory for reasons of accuracy and relevance. Include emissions from alternative daily cover (ADC) for reasons of accuracy, relevance, and completeness.
- **Wastewater treatment** – Omit emissions from wastewater treatment and discharge due to lack of relevance, consistency, and accuracy.
- **Water-related energy** – No change.
- **Agriculture** – No change.
- **High Global Warming Potential (GWP) GHGs** – Omit High Global Warming Potential GHGs from the GHG Inventory for reasons of relevance, consistency, and accuracy.

The City's community-wide greenhouse gas inventory would decrease by 105,133 metric tons of carbon dioxide equivalent (CO_2e) under these recommendations as shown in the table below.

Table A-1. *Peer Review and Update Recommendations*

Sector	2009 Sacramento County GHG Inventory	Update for CAP Purposes
Residential	234,771	229,841
Commercial/Industrial	101,607	101,607
On-Road Vehicles	338,005	357,309
Off-Road Vehicles	55,171	2,288
Waste	40,350	39,791
Wastewater Treatment	12,691	–
Water-Related	4,371	4,371
Agriculture	2,631	2,631
High GWP GHGs	53,374	–
Total	842,971	737,838

Modified sectors of the GHG Inventory are qualified below.

Residential Energy

Recommendation: Omit greenhouse gas emissions associated with residential wood burning due to lack of accuracy and consistency in appropriating emissions to Elk Grove relative to other communities. This recommendation will reduce GHGs by 4,930 metric tons of CO_2e.

The Inventory calculated emissions from residential electricity consumption, natural gas consumption, and wood and other solid-fuel burning activities. Electricity and natural gas emissions were calculated in a manner consistent with the International Protocol and best practices. The amount of wood burned within the County was provided by the Sacramento Metropolitan Air Quality Management District (SMAQMD) and converted to British Thermal Units (BTUs) using a heat fuel comparison published by the Energy Information Administration (EIA). The BTUs from wood burning countywide were then allocated to member cities based on population.

Distributing emissions from fireplace, stove, and pellet stove wood burning by population is not consistent with the principles of a community-wide inventory. This method is also inaccurate because it does not reflect Elk Grove's actual consumption patterns, which are likely lower due to the relatively new housing stock. Jurisdictions with an older housing stock are more likely to have functioning wood-burning fireplaces and fireplaces installed before efficiency regulations were codified by SMAQMD.

On-Road Emissions

Recommendation: Update the on-road emissions with new transportation figures provided by the County consistent with new state recommendations. The former inventory calculated emissions from VMT figures provided by the state for local VMT in each jurisdiction and highway VMT in the county. Highway VMT was appropriated to each Sacramento jurisdiction based on the length of highway miles in the jurisdiction.

In August 2010, the County contracted with Fehr & Peers, a transportation engineering consulting firm, to model VMT based on trip origins and destinations for each jurisdiction in Sacramento County. The model appropriates VMT in the following manner per trip type:

- Internal-Internal (I-I): 100%
  The model appropriates all VMT for trips with an origin and a destination in Elk Grove with no stops in between.
- Internal-External (I-X): 50%
  The model appropriates half of the VMT for trips that begin in the City and end outside of the City.
- External-Internal (X-I): 50%
  The model appropriates half of the VMT for trips that begin outside of the City and end inside the City.

This methodology was developed by the California Regional Targets Advisory Committee (RTAC), a committee responsible for the methodology used for regional target setting

under SB 375. Using this new methodology will better position the CAP for use in other planning documents both locally and regionally.

This change would increase emissions by 19,304 metric tons CO_2e.

Off-Road Emissions

Recommendation: Omit off-road emissions from the Inventory for lack of accuracy and consistency in appropriating countywide emissions for each jurisdiction. Include off-road emissions from agricultural off-road emissions, which will be appropriated based on the percentage of farmland in the City compared to the rest of Sacramento County.

The Inventory calculated emissions from off-road vehicles in Sacramento County in 2005 using the California Air Resources Board (CARB) OFFROAD 2007 software. OFFROAD accounts for the following main types of off-road equipment and vehicles:

- Recreational boats and vehicles
- Industrial equipment
- Construction equipment
- Lawn and garden equipment
- Airport ground support
- Military operations
- Agricultural equipment
- Rail operations equipment

Countywide emissions were apportioned to each jurisdiction within Sacramento County by population. This method is inconsistent with the inventory principles as outlined because it does not account for actual activity within the geopolitical boundary of Elk Grove. The City does not have a military base, body of water, or airport within its geopolitical boundary and therefore should not receive an equal per capita share of these emissions.

The alternative approach recommended herein is to appropriate emissions based on a factor of activity. For instance, if the City had 80 percent of recreational vehicle activity in 2005, we would appropriate 80 percent of recreational vehicle emissions to Elk Grove. Under this approach, Elk Grove would not receive any portion of emissions from airport ground support, military operations, and boat emissions.

Lawn and garden, construction equipment, and rail operations are difficult to appropriate as there is no available data on the level of these activities from one jurisdiction to another. However, one type of off-road emissions that we can properly allocate to Elk Grove are those from agricultural equipment. The amount of farmland in each jurisdiction is detailed in Appendix B of the City's inventory. Assuming constant use of agricultural equipment among all farmland in the county, we can estimate that 3.53 percent of off-road agricultural emissions are from Elk Grove. This percentage equates to approximately 2,288 metric tons of greenhouse gas emissions.

Waste

Recommendation: Exclude waste-in-place emissions from the GHG Inventory for reasons of accuracy and relevance. This recommendation will reduce GHGs by 2,246 metric tons of CO_2e. Include emissions from alternative daily cover (ADC) for reasons of accuracy, relevance, and completeness. This recommendation will increase GHGs by 1,687 metric tons of CO_2e.

The inventory includes two types of emissions from waste:

1) Landfill Emissions from Waste Generation in 2005 – Emissions from waste generated by Elk Grove residents and businesses in 2005, regardless of where the waste is landfilled.
2) Landfill Emissions from Waste-In-Place in 2005 – "Waste-in-place" emissions for all waste landfilled within the City in 2005, regardless of where the waste came from or who operates the landfill.

The first type of emissions accounts for activity in 2005, while the second type accounts for historical activity up until 2005. The waste-in-place method calculates methane released in 2005 from landfills within the geopolitical boundary of the City. The City does not own or operate these landfills. One of the landfills is closed while the other accepts waste from throughout the region.

In order to create consistency among all sectors and avoid double-counting, staff recommends that only landfill emissions from waste generation in 2005 are included in the inventory. This figure better represents actual behavior in the baseline year rather than historical behavior. Furthermore, it accounts for emissions that result from the behavior of Elk Grove residents and businesses. Waste-in-place, on the other hand, accounts for methane released from all waste in the landfill, regardless of where it came from. This could mean that the same metric ton of methane emissions is being accounted for in Elk Grove's waste-in-place calculation and in another city's landfill emissions from waste generation in that year.

Staff also recommends that the calculation of landfill emissions from waste generation in 2005 include emissions from alternative daily cover, or ADC. ADC is material other than soil such as tire pellets, ash, plant material, and compost that is placed on the surface of the active face of a municipal solid waste landfill at the end of each operating day to control vectors, fires, odors, blowing litter, and scavenging.[1] ADC is recorded separately from landfilled waste; however, the materials that compose ADC, especially compost and plant material, contribute to the overall methane emissions of the landfill.

The California Department of Resources Recycling and Recovery (CalRecycle) reports that Elk Grove produced approximately 20,000 tons of ADC in 2005. Assuming that the ADC is 90 percent organic material, this amount of ADC

[1] CalRecycle 2010.

equates to an additional 1,687 metric tons of greenhouse gas emissions.

Wastewater Treatment

Recommendation: Omit emissions from wastewater treatment and discharge due to lack of relevance, consistency, and accuracy. This recommendation will decrease GHGs by 12,691 metric tons CO_2e.

The Inventory includes an estimate of emissions from wastewater treatment and discharge based on state averages. The Inventory used a California Air Resources Board (CARB) statewide per capita emissions figure for domestic wastewater treatment and discharge in 2004 to estimate emissions in Sacramento County. These emissions were then applied to the population of each city and the county in 2005 to estimate overall emissions.

Calculating emissions based on a statewide average per capita figure does not account for multiple factors, including:

- Varying efficiencies in the wastewater treatment and discharge systems throughout the state of California.
- Varying water efficiency standards from jurisdiction to jurisdiction.
- Actual activity within the City.

These emissions also lack relevance. Unless the facilities are owned and operated by the City, the community and City has little control over their efficiencies.

High Global Warming Potential GHGs

Recommendation: Omit High Global Warming Potential GHGs from the GHG Inventory for reasons of relevance, consistency, and accuracy. This recommendation will decrease emissions by 53,374 metric tons of CO_2e.

High Global Warming Potential (GWP) GHGs are a result of refrigerants and electric utility transmission and distribution equipment. High GWP GHGs are also emitted during semiconductor manufacturing. The Inventory appropriates this type of emissions to Elk Grove using a statewide high GWP GHG emissions trendline from 1990 to 2004. This trendline was used to estimate 2005 high GWP emissions, which were then distributed to Elk Grove based on population.

Calculating emissions based on a statewide average per capita figure does not account for multiple factors, including:

- The amount of refrigerants in Elk Grove as opposed to other communities.
- The amount of utility transmission and distribution equipment within Elk Grove.
- The amount of semiconductor manufacturing processes occurring in Elk Grove.

It is therefore staff's recommendation that this emissions source be omitted from the inventory.

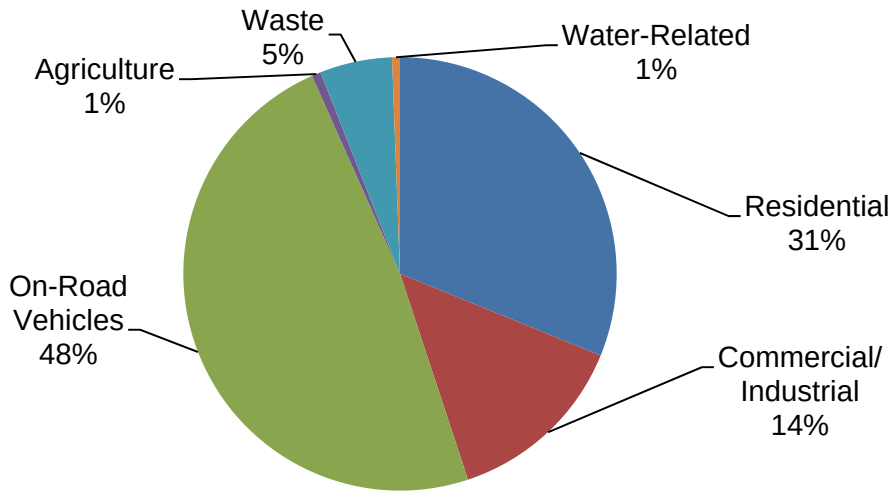
SUMMARY

The recommended updates would result in a new emissions total of 737,838 metric tons of CO_2e, or roughly 105,133 metric tons less than the 2009 Sacramento County Inventory. Since off-road emissions were restricted to agricultural off-road emissions as part of the Inventory update, off-road emissions were re-categorized as agricultural emissions. As illustrated in the figures and tables below, the transportation sector is responsible for the majority of emissions released in the Elk Grove community (48.43 percent). Electricity and natural gas consumption in the residential and commercial/industrial sector constitute the second largest sector (31.15 percent and 13.77 percent, respectively). Waste comprises the third largest sector with 5.39 percent of emissions, while agriculture contributes the smallest amount (0.7 percent).

Table A-2. *Updated Emissions by Sector*

Sector	Metric Tons CO_2e	Percentage of Total
Residential	229,841	31.15%
Commercial/Industrial	101,607	13.77%
On-Road Vehicles	357,309	48.43%
Waste	39,791	5.39%
Water-Related	4,371	0.59%
Agriculture	4,919	0.67%
Total	737,838	100.00%

Figure A-1. *Updated Emissions by Sector, 2005*



COMMUNITY-WIDE FORECAST RECOMMENDATION

Business-as-Usual Forecast

A business-as-usual forecast determines how baseline greenhouse gas emissions will grow with future population, housing, and job growth if current consumption trends and efficiencies do not change. A forecast serves as the essential "no project" scenario to demonstrate how conditions will change without Climate Action Plan implementation.

The forecast year of 2020 was chosen to align with Assembly Bill 32, which creates a statewide emission reduction target of 15 percent below 2005 levels by 2020. The forecast year 2025 was also chosen to be consistent with the Elk Grove General Plan buildout year.

The energy, waste, and agriculture sectors are based on growth projections for population, household, and job growth in the Elk Grove area.

Table A-3. *GHG Inventory "Business-as-Usual" Forecast Results*

Emissions Growth	2005 Baseline	2010	2020	2025
Residential	229,841	255,971	311,554	345,748
Commercial/Industrial	101,607	138,482	181,758	203,498
Transportation	357,309	386,925	462,210	508,997
Agriculture*	4,919	3,689	1,230	0
Waste	39,791	44,314	53,937	59,857
Water-Related	4,371	5,391	6,811	7,591
Total	737,838	834,773	1,017,499	1,125,691
Percentage Increase from Baseline	0.00%	13.14%	37.90%	52.57%

** Agriculture emissions include off-road equipment and vehicles associated with agriculture and direct emissions from fertilizer and cows.*

INCORPORATION OF STATE REDUCTIONS INTO FORECASTS

State-led and State-induced reduction strategies included in the AB 32 Scoping Plan are accounted for in the City's adjustment of the business-as-usual forecast. To clarify, the State of California has approved, programmed, and/or adopted these actions. Furthermore, they are programs or projects that require no local involvement. Incorporating them into the forecast

and reduction assessment provides a more accurate picture of future emissions growth and the responsibility and ability of local governments versus the State to reduce greenhouse gas emissions. A description for each of these actions is provided below, together with the methodology used to quantify the impact of each action on GHG emissions.

State Reductions

AB 1493 (Pavley)

Assembly Bill 1493 (Pavley), signed into law in 2002, will require carmakers to reduce greenhouse gas emissions from new passenger cars and light trucks beginning in 2011. The California Air Resources Board (CARB) adopted regulations in September 2004 that create two phases of increasingly stringent standards for car manufacturers between 2009 and 2020. It is expected that new vehicles sold in California will create an average of 16 percent fewer greenhouse gas emissions than current models.

Calculation Background

The Pavley rules establish GHG emission standards for two different groups of passenger vehicles: (1) passenger cars (PC) and light-duty trucks with test weights under 3,751 pounds loaded vehicle weight (LDT1); and (2) light-duty trucks with test weights between 3,751 pounds loaded vehicle weight and 8,500 pounds gross vehicle weight (GVW) (LDT2). Medium-duty passenger vehicles (LDT3) between 8,500 and 10,000 pounds GVW are included with manufacturers' LDT2 vehicles when determining compliance with California's GHG standards. For the purposes of this analysis, only vehicles up through 8,500 pounds were considered since the majority of LDT3 vehicles are commercial and therefore do not fall under the scope of the Pavley rules.

The GHG emission standards established by the Pavley regulation reflect not only exhaust CO_2 emissions resulting directly from operation of the vehicle, but also: (1) tailpipe emissions of methane and nitrous oxide; (2) CO_2 emissions resulting from operating the air conditioning system (indirect AC emissions); and (3) hydrofluorocarbon refrigerant emissions released from the air conditioning system due to either leakage, losses during recharging, sudden releases due to accidents, or release from scrappage of the vehicle at end of life (direct AC emissions). In this analysis, we're only accounting for CO_2 from tailpipe emissions (1). Air conditioning is not included in EMFAC estimates of CO_2e and methane and therefore is not accounted for in the reductions.

Low Carbon Fuel Standard

The State is proposing to reduce the carbon intensity of transportation fuels consumed in California. To reduce the carbon intensity of transportation fuels, CARB is developing a Low Carbon Fuel Standard (LCFS), which would reduce the carbon intensity of California's transportation fuels by at least 10 percent by 2020 and 20 percent by 2035 as called for by Governor Schwarzenegger in Executive Order S-01-07. LCFS will incorporate compliance mechanisms that provide flexibility to fuel

providers in how they meet the requirements to reduce greenhouse gas emissions.

Calculation Background

Pursuant to the AB 32 Scoping Plan, the LCFS will examine the full fuel cycle impacts of transportation fuels and CARB will work to design the regulation in a way that most effectively addresses the issues raised by the Environmental Justice Advisory Committee and other stakeholders. CARB identified the LCFS as a discrete early action item and is developing a regulation for Board consideration in March 2009. A 10 percent reduction in the intensity of transportation fuels is expected to equate to a reduction of 16.5 $MMTCO_2e$ in 2020. However, in order to account for possible overlap of benefits between LCFS and the Pavley greenhouse gas standards, CARB has discounted the contribution of LCFS to 15 $MMTCO_2e$.

Therefore, LCFS will be responsible for a 9 percent reduction in global warming intensity (GWI) by 2020 and assumes a 10 percent reduction in GWI by 2025.

Other Reductions

In addition to the state-led reductions accounted for in the City's business-as-usual forecast, additional initiatives have been initiated by entities other than the City that will affect emissions at the local level. These utility-led and state-induced actions are accounted for in the forecast, but are more dependent on regional or local action for implementation. Hence, the impetus for reductions that result from these actions originates outside of the realm of the City's influence, but achievement of reductions is dependent on local action.

Other state initiatives such as funding mechanisms and loan programs are not included in state reductions that are accounted for in the business-as-usual forecast, or here as utility-led or state-induced measures. Rather, they are included within the local reductions as appropriate because of the need for or requirement for local government implementation or contribution to the effort.

SMUD RPS: Renewables Portfolio Standard –Increase the portion of energy that comes from renewable sources to 20% by 2010 and by 33% by 2020.

Established in 2002 in Senate Bill 1078, the Renewables Portfolio Standard (RPS) establishes targets for utility providers to utilize energy that results from renewable sources. While RPS only requires investor-owned utilities to achieve these standards, Sacramento Municipal Utilities District (SMUD), a publicly owned utility, has elected to comply with the RPS standards. A June 2009 report from the California Public Utilities Commission (CPUC) indicated that it is unlikely that the State and its investor-owned utilities will be able to reach the RPS goal of 33 percent by 2020. SMUD is the only major utility expected to achieve the 2010 RPS goal, though they have indicated that meeting the 2020 goal of 33 percent will be challenging unless transmission, permitting, and supply barriers can be overcome.

Calculation Background

Calculations assume SMUD will achieve 33 percent renewable sources by 2025, based on the following:

- CPUC (July 2008). Renewables Portfolio Standard Quarterly Report. http://docs.cpuc.ca.gov/ published/REPORT/85936.htm#P31_3968 (accessed June 25, 2010).
- CPUC (June 2010) Renewables Portfolio Standard Quarterly Report. http://www.cpuc.ca.gov/NR/ rdonlyres/66FBACA7-173F-47FF-A5F4-BE8F9D70DD59/0/Q22010RPSReporttotheLegislature.pdf (accessed July 1, 2010).
- SMUD (September 2009) 2008 Renewable Energy Status Report at SMUD. http://www.smud.org/ en/community-environment/solar-renewables/Documents/SMUD%20Brief%20on%20RPS%2009-28-09-S%20ML%20MD.pdf (accessed July 27, 2010).

Title 24 (CALGreen) – 2008 Standards

Title 24 of the California Code of Regulations mandates how each new home and business is built in California. It includes requirements for the structural, plumbing, electrical, and mechanical systems of buildings and for fire and life safety, energy conservation, green design, and accessibility in and around buildings. The 2010 triennial edition of Title 24 pertains to all occupancies that applied for a building permit on or after January 1, 2011, and remains in effect until the effective date of the 2013 triennial edition. This Inventory focuses on two sections of Title 24: Part 6 (the California Energy Code) and Part 11 (the California Green Building Standards Code). These two sections require direct electricity, natural gas, and water savings for every new home or business built in California. Title 24 is a statewide standard applied at the local level by local agencies through project review. Title 24 requirements apply to energy use associated with water heating, space cooling, space heating, and other building processes. The updates do not directly create new requirements for energy use associated with appliances or plug-load activity.

This forecast incorporates the net energy benefit of new Title 24 requirements that did not exist in the baseline year. These estimates are based on California Energy Commission studies that compare each new update of Title 24 to its former version. The AB 32 Scoping Plan calls for ongoing triennial updates to Title 24 that yield regular increases in mandatory energy and water savings for new construction. As such, the GHG forecast also includes a conservative estimate of the energy and water reductions due to future updates of Title 24 based on historic growth rates. The energy reductions quantified in the forecast from Part 6 Energy Code updates are based on the assumption that the triennial updates to the code will yield regular decreases in the maximum allowable amount of energy used from new construction. The adjusted forecast is a conservative estimate of energy reductions, anticipating ongoing improvements relative to the previous adopted code. In May of 2012, the California Energy Commission adopted the 2013

update to Title 24 that goes into effect on January 1, 2014. This update exceeded the expectations of this forecast, identifying a 25 percent improvement in efficiency over the previous code for residential construction and a 30 percent improvement in efficiency for nonresidential construction. Reduction measures in the Climate Action Plan capture the remaining credit for the 2013 code update, which is not calculated in this forecast.

Calculation Background

- Assumes that all development between 2010 and 2025 meets Title 24 2008 minimum efficiency standards
- Assumes all growth in natural gas and electricity sectors is from new construction
- Calculations for reductions to residential and nonresidential development are applied to energy use associated with the end-use processes affected by Title 24, based on information from the California Energy Commission, in addition to end-use information for climate zone 12 as identifed by the Commercial End-Use Survey and the Residential Appliance Saturation Survey.
- Calculates an average improvement of 3 percent electricity efficiency and 7 percent natural gas efficiency in commercial construction for cooling, process energy, and ventilation end uses.
- Calculates an average improvement of 16 percent electricity efficiency and 7 percent natural gas efficiency in residential construction for air conditioning, evaporative cooling, room cooling, and primary and auxiliary heating.

Calculations for the forecast are informed by the following sources:

2008 Title 24 Energy Efficiency Improvements in comparison to 2005 baseline Title efficiency standards (California Energy Commission, Impact Analysis: 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings, November 2007).

Itron, Inc. California Commercial End-Use Survey – Results Page. 2007. http://capabilities.itron.com/CeusWeb/Chart.aspx.

KEMA, Inc. 2010. 2009 California Residential Appliance Saturation Study, Volume 2: Results. CEC-200-2010-004.

ADJUSTED FORECASTS

Reductions that result from State-led or State-induced actions are provided below. These represent reductions that will be achieved in the target years but that the City is not responsible for implementing.

Table A-4. *State Reductions*

	2005	2010 ($MTCO_2e$/yr)	2020 ($MTCO_2e$/yr)	2025 ($MTCO_2e$/yr)
Business-as-Usual Projection		834,773	1,017,499	1,125,691
SMUD Renewables Portfolio Standard (RPS)		-17,404	-102,452	-121,063
CALGreen Code		0	-17,305	-34,786
AB 1493 (Pavley)		-1,366	-65,140	-93,657
Low Carbon Fuel Standard (LCFS)		0	-29,642	-30,571
Subtotal State Reductions		-18,770	-214,539	-280,077
Emissions Forecast	**737,838**	816,003	802,960	845,614

The updated emissions forecast that accounts for these reductions is provided below.

Table A-5. *Adjusted Emissions Forecast**

Emissions Growth	2005 Baseline	2010	2020	2025
Residential	229,841	244,825	245,089	260,251
Commercial/Industrial	101,607	132,432	129,561	134,441
Transportation	357,309	385,559	367,428	384,770
Agriculture**	4,919	3,689	1,230	0
Waste	39,791	44,314	53,937	59,857
Water-Related	4,371	5,181	5,714	6,294
Total	737,838	816,000	802,960	845,614
Percentage Increase from Baseline	0.00%	10.59%	8.83%	14.61%

Note: due to rounding, the total may not equal the sum of component parts or the totals in **Table A-4.*
***Agriculture emissions include off-road equipment and vehicles associated with agriculture and direct emissions from fertilizer and cows.*

Reduction Measure Assumptions

This appendix outlines the greenhouse gas (GHG) reductions for each measure, along with the methodology and assumptions that contributed to each calculation.

Supporting Measures for the Built Environment (BE)

BE-1. Building Stock: Promote Energy Conservation

Promote energy conservation by residents and businesses in existing structures in close coordination with other agencies and local energy providers, including the Sacramento Municipal Utility District (SMUD) and Pacific Gas and Electric (PG&E).

GHG Reductions

- 2020 reductions ($MTCO_2e$): 1,700
- 2025 reductions ($MTCO_2e$): 2,700

Target Indicators

- 25% household and business participation in conservation programs
- 25% household participation in monitoring programs that are supported by the smart grid

Method: Based on a 2011 Residential Behavior Profile and findings for the Sacramento identified by ICF, assumed participation rates in outreach programs and in-home monitoring programs calculated for existing households. Energy reductions based on case studies and SMUD reports on smart-grid efficacy.

Sources

Bonneville Power Administration. 2011. Residential Behavior-Based Energy Efficiency Program Profiles 2011. http://www.bpa.gov/Energy/n/pdf/BBEE_Res_Profiles_Dec_2011.pdf.

ICF. 2011. GHG Reduction Measure Analysis for SMUD.

SMUD Smart Grid Activities 2010 Presentation. https://www.smud.org/en/residential/customer-service/smart-meters/.

Additional Performance Summary

- Outreach – reduction per household (kWh): 100
- Outreach – reduction per household (therms): 5
- Outreach – number of households: 10,689
- Monitoring – reduction per household (kWh): 410
- Monitoring – reduction per household (therms): 18
- Monitoring – number of households participating: 10,689
- Outreach – reduction per business (kWh): 770
- Outreach – reduction per business (therms): 14
- Outreach – number of businesses: 854

BE-2. Building Stock: Residential Appliances in Existing Development

Support residential upgrades to more energy-efficient, cost-saving appliances for existing homes, leveraging regional and state resources to target indoor and outdoor appliances and equipment in existing homes.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 2,690
- 2025 reductions ($MTCO_2e$): 3,930

Target Indicators

- 20% single-family household participation in energy-efficient appliance programs
- 5% multi-family household participation in energy-efficient appliance programs
- 10% of single-family households to install in solar water heaters
- 5% of multi-family households to install solar water heaters
- 15% of single-family households to upgrade pool pumps
- 5% of multi-family developments to upgrade pool pumps

Method: Calculation assesses impact of appliance upgrades for existing development only. Reductions for each category of appliance upgrades were calculated using single-family and multi-family household electricity from CAPCOA Table BE 4-2 for climate zone 12 and applied to baseline electricity usage per household to render reductions by household. A target utilization rate of 50% was applied to all participating households and total reductions to reflect the likelihood that not all appliances, internal to the CAPCOA assumption, will be retrofitted in the participating homes. Solar water heater reductions calculated based on the amount of natural gas offset on average in comparison to conventional water heaters in climate zone 12.

Pool pump savings calculated using the 2010 Residential Appliance Saturation Study, assuming the average amount of electricity used per household on pool pumps. Usage data for PG&E service territory was used; usage data was not available for SMUD territory or climate zone 12 information. As the use is not climate-dependent, usage in PG&E's service territory was used as a proxy. Information provided by the City of Elk Grove was used to calculate the average annual number of pool permits issued since incorporation. This estimate of the number of pools was combined with the target participation rates and the CEC source below for reductions from retrofitting a conventional pump to a variable-speed-drive pool pump.

Sources

California Energy Commission. 2007. Draft Residential Swimming Pool Report. http://www.energy.ca.gov/title24/2008standards/prerulemaking/documents/2007-02-26-27_workshop/supporting/PGE-DRAFT_REPORT_RESIDENTIAL_SWIMMING_POOL.PDF.

CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures. http://capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf.

Additional Performance Summary

- Target single-family household participation rate in energy-efficient appliance program (percentage of all homes): 20%
- Target multi-family household participation rate in energy efficient appliance program (percentage of all homes): 5%
- Appliance utilization rate: 70%

- Target single-family household participation rate in solar hot water program (percentage of all homes): 10%
- Target multi-family household participation rate in solar hot water program (percentage of all homes): 5%
- Target single-family household participation rate in pool pump program (percentage of homes with pools): 15%
- Target multi-family household participation rate in pool pump program (percentage of homes with pools): 5%

BE-3. Building Stock: Nonresidential Appliances in Existing Development

Equip businesses in Elk Grove to reduce operational expenses and maximize energy efficiency through the use of energy-efficient and cost-effective indoor and outdoor appliances and equipment.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 1,360
- 2025 reductions ($MTCO_2e$): 2,460

Target Indicators: 25% participation of businesses or the equivalent of a million square feet of nonresidential square feet participating in appliance upgrades by 2020

Method: Nonresidential electricity and natural gas use was assessed by end-use using the 2007 California Commercial End-Use Survey. Energy savings by end-use function calculated based on case studies. A target utilization rate was applied to reflect the likelihood that not all efficiency measures would take place in participating businesses. Reductions only include savings for end-uses associated with nonresidential appliances. An estimated number of square feet per employee was calculated based on an assumption of 400 square feet per employee. Participation rates were assumed based on regional assessments prepared by SMUD in a 2011 analysis for SMUD.

Sources

Brown, Rich, Sam Borgeson, Jon Koomey, and Peter Biermayer. 2008. U.S. Building-Sector Energy Efficiency Potential. Ernest Orlando Lawrence Berkeley National Laboratory, University of California. http://enduse.lbl.gov/info/LBNL-1096E.pdf.

ICF. 2011. GHG Reduction Measure Analysis for SMUD.

Itron, Inc. 2007. California Commercial End-Use Survey – Results Page. http://capabilities.itron.com/CeusWeb/Chart.aspx.

Additional Performance Summary

- kWh saved per participating business: 7,290
- Therms saved per participating business: 30
- kWh saved per participating square foot: 2.52
- Therms saved per participating square foot: 0.01
- Target appliance utilization rate: 0.5

BE-4. Building Stock: Retrofits to the Existing Housing Stock

Promote retrofits in the existing residential housing stock, leveraging existing local programs and regional resources to reduce household energy costs and increase home values.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 394
- 2025 reductions ($MTCO_2e$): 588

Target Indicators

- 10% of single-family homes constructed before 1990 to complete energy efficiency retrofits
- 1% of total multi-family homes constructed before 1990 to complete energy efficiency retrofits

Method: Focuses on energy-saving potential for existing homes based on energy efficiency potential identified by ICF in a 2011 analysis for SMUD for single-family homes. Measure targets participation of homes constructed before 1990 to maximize energy-savings potential. Multi-family savings calculated assuming results from a City-funded retrofit of a multi-family complex owned by the Sacramento Housing Regional Alliance.

Sources

ICF. 2011. GHG Reduction Measure Analysis for SMUD.

KEMA, Inc. 2010. 2009 California Residential Appliance Saturation Study, Volume 2: Results. CEC-200-2010-004.

Additional Performance Summary

- kWh saved per single-family household: 2,737
- Total kWh percentage reduction per single-family household: 25%
- Therms saved per single-family household: 24
- Total therm percentage reduction per single-family household: 5%
- kWh saved per multi-family household: 981
- Total kWh percentage reduction per multi-family household: 18%
- Average therms saved per multi-family household: 19
- Total therm percentage reduction per multi-family household: 21%

BE-5. Building Stock: Nonresidential Retrofits

Facilitate retrofits and energy efficiency improvements within the existing nonresidential building stock that reduce maintenance and operation costs.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 1,590
- 2025 reductions ($MTCO_2e$): 2,810

Target Indicator

- 25% participation of nonresidential square footage to undergo retrofits

Method: Nonresidential energy use was calculated by end-uses using the 2007 California Commercial End-Use Survey. Savings were identified by end-use category, assuming average energy reduction potential for end-uses associated with heating, air conditioning, and ventilation systems. An estimated number of 400 square feet per employee was applied to the number of businesses. Participation rate identified by ICF in the Sacramento region for SMUD. A target utilization rate was also applied to reflect the likelihood that not all efficiency measures would take place in participating businesses.

Sources

Brown, Rich, Sam Borgeson, Jon Koomey, and Peter Biermayer. 2008. U.S. Building-Sector Energy Efficiency Potential. Ernest Orlando Lawrence Berkeley National Laboratory, University of California. http://enduse.lbl.gov/info/LBNL-1096E.pdf.

Itron, Inc. 2007. California Commercial End-Use Survey – Results Page. http://capabilities.itron.com/CeusWeb/Chart.aspx.

Additional Performance Summary

- kWh saved per participating business:5,600
- Therms saved per participating business: 140
- kWh saved per participating square feet: 1.94
- Therms saved per participating square feet: 0.05

BE-6. Building Stock: New Construction

Adopt CALGreen Tier 1 standards to require all new construction to achieve a 15 percent improvement over minimum Title 24 CALGreen energy requirements.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 3,286
- 2025 reductions ($MTCO_2e$): 4,614

Target Indicators

- Adoption of Tier 1 standards
- 80% participation of new development from 2012 to 2020 to comply with Tier 1 standards
- 100% participation of new development from 2021 to 2035 to comply with Tier 1 standards

Method: Identifies the additional incremental energy benefit from the end-uses affected by Title 24, assuming the additional benefit of Tier 1 standards beyond the improving levels of energy efficiency assumed in the adjusted business-as-usual forecast. The increased level of energy performance for the 2013 code was calculated by residential and nonresidential end-use, based on California Energy Commission assessments. For residential uses, assumes increased efficiency for central air conditioning, room air conditioning, and evaporative cooling averages for climate zone 12 as identified by the Residential Appliance Saturation Survey. For nonresidential uses, assumes increased efficiency of cooling, process energy use, and ventilation, as identified by the Commercial End-Use Survey. Identifies the effective impact of increased Title 24 standards using CAPCOA's rates of actual energy reduction by land use type for each percentage improvement over Title 24.

Sources

Brook M., B. Chrisman, P. David, T. Ealey, D. Eden, K. Moore, K. Rider, P. Strait, G. D. Taylor, and J. Wu. 2011. Draft Staff Report: Achieving Energy Savings in California Buildings (11-IEP-1F). California Energy Commission, Efficiency and Renewables Division. CEC-400-2011-007-SD.

California Energy Commission. 2012. 2013 Building Energy Efficiency Standards. http://www.energy.ca.gov/title24/2013standards/rulemaking/documents/2012-5-31-Item-05-Adoption_Hearing_Presentation.pdf.

Itron, Inc. 2007. California Commercial End-Use Survey – Results Page. http://capabilities.itron.com/CeusWeb/Chart.aspx

KEMA, Inc. 2010. 2009 California Residential Appliance Saturation Study, Volume 2: Results. CEC-200-2010-004.

Additional Performance Summary

- Number of homes participating: 5,312
- Total square footage participating:3,360,000
- kWh saved per home: 643
- Therms saved per home: 57
- kWh saved per business square foot: 1.3125
- Therms saved per businesss square foot: 0.0078

BE-7. Building Stock: Appliances and Equipment in New Development

Encourage the use of energy-efficient appliances and equipment in new buildings that maximize efficiency.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 510
- 2025 reductions ($MTCO_2e$): 920

Target Indicators

- Approximately 2,000 new single-family homes participating in appliance upgrades
- Approximately 20 new multi-family households participating in appliance upgrades
- Approximately 350 new single-family homes installing solar water heaters
- Approximately 600 new homes or multi-family complexes installing variable- or multi-speed pool pumps

Method: The number of 2020 households was divided by the community 2020 residential kWh projection to determine 2020 kWh per household. The number of existing households was subtracted from the 2020 household estimate to identify the number of new households that will be constructed and addressed by this measure. Average energy-efficient appliance reduction rates were applied to these figures to estimate reductions, using information from the Residential Appliance Saturation Survey, the Commercial End-Use Survey, and energy trends for pool pumps identified by the California Energy Commission. The total number of new pools was estimated assuming the annual average pool permits approved by the City since 2005.

Sources

Brown, Rich, Sam Borgeson, Jon Koomey, and Peter Biermayer. 2008. U.S. Building-Sector Energy Efficiency Potential. Ernest Orlando Lawrence Berkeley National Laboratory, University of California. http://enduse.lbl.gov/info/LBNL-1096E.pdf.

California Energy Commission. 2007. Draft Residential Swimming Pool Report. http://www.energy.ca.gov/title24/2008standards/prerulemaking/documents/2007-02-26-27_workshop/supporting/PGE-DRAFT_REPORT_RESIDENTIAL_SWIMMING_POOL.PDF.

CAPCOA. 2010. Quantifying Greenhouse Gas Mitigation Measures. http://capcoa.org/wp-content/uploads/2010/11/CAPCOA-Quantification-Report-9-14-Final.pdf.

Itron, Inc. 2007. California Commercial End-Use Survey – Results Page. http://capabilities.itron.com/CeusWeb/Chart.aspx.

KEMA, Inc. 2010. 2009 California Residential Appliance Saturation Study, Volume 2: Results. CEC-200-2010-004.

Additional Performance Summary

- Appliances – energy reduction per participating single-family home (kWh): 150
- Appliances – energy reduction per participating multi-familly home (kWh): 210
- Solar water heater reduction per household (therms): 150
- Pool pumps – reduction per participating household (kWh): 1,300

BE-8. Community Forestry

Plant trees in appropriate densities and locations that will maximize energy conservation and air quality benefits.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 752
- 2025 reductions ($MTCO_2e$): 376

Target Indicators

- 25,000 new trees to shade buildings by 2020

Method: Calculates the energy credit for reduced building air conditioning and climate cooling associated with tree plantings by increasing the tree canopy above 20% (baseline statistic). Assumes distribution of 70% deciduous and 30% evergreen trees planted through this program; the distribution of trees is proportional to the distribution of the age of the City's building stock based on regional averages. Total emissions reductions include annual sequestration during a 40-year life cycle of a forestry program, avoided emissions from the reduction in electricity consumption as a result of direct shading, and overall climate cooling.

Sources

City of Elk Grove. 2007. City of Elk Grove Urban Forest Canopy Assessment.

McPherson, et al. 2000. "The potential of urban tree plantings to be cost effective in a carbon market."

Additional Performance Summary

- Deciduous trees planted:17,500
- Evergreen trees planted: 7,500
- Average emissions reduction per year per tree ($MTCO_2e$): 0.030066489

BE-9. Cool Paving Materials

Encourage the use of high-albedo material for future outdoor surfaces to the greatest extent feasible, including but not limited to parking lots, median barriers, roadway improvements, and sidewalks.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 2,890
- 2025 reductions ($MTCO_2e$): 3,203

Target Indicators

- Assumes achievement of approximately 46% of urban area paved with high-albedo surfaces

Method: Based on sources cited below. Assumes a 15% increase in high-albedo pavement. Reduction in electricity demand is calculated based on the citywide cooling that will result from the increase in high-albedo surfaces.

Sources

Akbari, Hashem. 2001. Cool Surfaces and Shade Trees to Reduce Energy Use and Improve Air Quality in Urban Areas. http://www.fs.fed.us/ccrc/topics/urban-forests/docs/cool%20surfaces%20and%20shade%20trees%20to%20improve%20air%20quality.pdf.

Akbari, Hashem. n.d. Energy Saving Potentials and Air Quality Benefits of Urban Heat Island Mitigation. http://www.osti.gov/bridge/servlets/purl/860475-UlHWIq/860475.pdf.

EPA. 2003. Cooling Summertime Temperatures: Strategies to Reduce Urban Heat Islands. http://www.epa.gov/heatisland/resources/pdf/HIRIbrochure.pdf.

Rosenfeld, Arthur. 2008. Energy Efficiency: The first and most profitable way to delay Climate Change. http://www.energy.ca.gov/2008publications/CEC-999-2008-015/CEC-999-2008-015.ppt#264,1.

Additional Performance Summary

- Temperature decrease (Celsius) per percentage increase in high-albedo surfaces: 0.8
- Percentage reduction in total energy demand: 0.024

BE-10. On-Site Renewable Energy Installations

Promote voluntary installations of on-site solar photovoltaics in new and existing development, and revise standards to facilitate the transition to solar water heaters and solar photovoltaics in new development.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 9,154
- 2025 reductions ($MTCO_2e$): 12,804

Target Indicators

- Approximately 10,000 homes to install solar photovoltaic systems by 2020 and 14,000 homes to install by 2025
- Approximately 400 businesses to install solar photovoltaic systems by 2020 and 800 businesses to install by 2025

Method: Assumes the transition to renewable solar photovoltaics. For new homes, assumes 35% will install solar, based on the City's requirement for solar prewiring and projected participation rates identified the California Energy Commission for the Homebuyer Solar Program. Participation of existing homes based on the provision of renewable financing and existing trends within the SMUD territory. Also assumes that 5% of existing businesses and 10% of new businesses will meet 15% of their energy needs with on-site renewable sources as a result of the prewiring requirements and new incentives that the City will implement.

Sources

California Energy Commission. 2010. Homebuyer Solar. CEC-300-2010-009. http://www.energy.ca.gov/2010publications/CEC-300-2010-009/CEC-300-2010-009-SF.PDF.

ICF. 2011. GHG Reduction Measure Analysis for SMUD.

Additional Performance Summary

- Average annual kW generated by solar photovoltaic systems for existing buildings, based on regional trends: 4,519
- Average annual kWh generated by solar photovoltaic systems for new homes in climate zone 12, as estimated by the California Energy Commission: 3,942

BE-11. Off-Site Renewable Energy

Encourage participation in SMUD's off-site renewable energy programs, which allow building renters and owners to choose locally produced cleaner electricity sources.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 12,964
- 2025 reductions ($MTCO_2e$): 17,794

Target Indicators

- 15% participation in Greenergy by 2020
- 20% participation in Greenergy by 2025

Method: SMUD allows customers to opt into the Greenergy program in order to achieve up to a 100% renewable energy mix. To ensure that the renewable credit goes toward participating customers, SMUD retains the Renewable Energy Credits for this program. Based on existing Greenergy trends identified by ICF, assumes an existing regional customer participation rate of 9% in the SMUD

territory. Assumes an equivalent participation rate in Elk Grove. City will support up to a 15% market penetration for local participation in the Greenergy program. This measure assumes the incremental benefit for participating customers to exceed the minimum Renewables Portfolio Standard's energy mix assumed in the adjusted forecast. Greenergy provides option for participants to receive either 50% or 100% renewable energy, depending on the monthly payment. Measure assumes an average 75% renewable energy mix to account for participation across both program options.

Sources

ICF. 2011. GHG Reduction Measure Analysis for SMUD.

SMUD. 2010. Greenergy Label. http://www.energy.ca.gov/sb1305/labels/2010_labels/SMUD_PCL.pdf.

SMUD. 2012. Greenergy Program. https://www.smud.org/en/residential/environment/greenergy/.

Additional Performance Summary

- Market penetration for Greenergy: 15%
- Forecast electricity mix – Renewables Portfolio Standard: 33%
- Greenergy opt-in option 1: renewable electricity mix: 50%
- Greenergy opt-in option 2: renewable elecrticity mix: 100%
- Average Greenergy opt-in renewable electricity mix: 75%
- Additional renewable electricity credit in addition to Renewables Portfolio Standard: 42%
- Target market penetration for Greenergy in Elk Grove: 15%

Supporting Measures for Resource Conservation (RC)

RC-1. Waste Reduction

The City shall facilitate recycling, reduction in the amount of waste, and reuse of materials to reduce the amount of solid waste sent to the landfill from Elk Grove and achieve an 80 percent diversion by 2020..

GHG Reductions

- 2020 reductions ($MTCO_2e$): 27,626
- 2025 reductions ($MTCO_2e$): 30,658

Target Indicator

- Achieve an 80% diversion rate by 2020.

Method: In 2005, the City of Elk Grove reported a 59% diversion rate for solid waste. The measure calculates the reduction in emissions that will result from achieving an 80% diversion rate. Through the enactment of AB 341, CalRecycle is tasked with implementing a plan to achieve a policy goal of 75% diversion of the solid waste generated to be source-reduced, recycled, or composted by 2020. This will be achieved through statewide improvements to recycling infrastructure, an increase in services for organics, and mandatory recycling requirements for commercial uses.

Sources

CalRecycle. 2010. Jurisdiction Profile. Accessed June 2010. http://www.calrecycle.ca.gov/Profiles/Juris.

CalRecycle. 2012. California's New Goal: 75% Recycling. http://www.calrecycle.ca.gov/75percent/Plan.pdf.

Additional Performance Summary

- Business-as-usual tonnage in 2020: 151,816
- Baseline diversion rate: 0.59
- Target diversion rate by 2020: 0.8
- Additional tonnage diverted through measure by 2020: 77,759

RC-2. Water Conservation

Reduce the amount of water used by residential and nonresidential uses.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 589
- 2025 reductions ($MTCO_2e$): 637

Target Indicators

- Achieve a 28% reduction in water consumed within city limits by 2020.

Method: The average potential of all possible water reductions in millions of gallons for residential indoor, residential outdoor, commercial/institutional, and industrial uses was identified, assuming achievement of regional and statewide water reduction goals identified by California's 20X20 target. To determine the amount of water consumed in the City, the average of annual million gallons (MG) of water consumption per person was applied to the City's population to get a total water consumption figure, using average consumption rates for Sacramento County in 2005.

Sources

California Department of Water Resources. 2010. 20X2020 Water Conservation Plan. http://www.water.ca.gov/wateruseefficiency/sb7/docs/20x2020plan.pdf.

US Geological Survey. 2010. http://water.usgs.gov/watuse/data/2005/index.html.

Additional Performance Summary

- Estimated water consumed (MG) in 2020: 14,288
- Estimated annual water reduction (MG) by 2020: 4,001
- Percentage reduction in annual water use by 2020: 0.28

RC-3. Recycled Water

Promote and remove barriers to the use of greywater systems and recycled water for irrigation purposes.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 5
- 2025 reductions ($MTCO_2e$): 9

Target Indicators

- Meet 10% of local water needs by 2020 with recycled sources.

Method: Based on case studies, quantifies the impact of increased recycled water use on reduced electricity use for water suppply and transport. Electricity benefits are achieved thorugh recycled water by reducing the need to treat and transport additional potable water, since recycled water can be supplied from local sources after wastewater treatment.

Sources

California Sustainability Alliance. 2008. The Role of Recycled Water in Energy Efficiency and Greenhouse Gas Reduction. http://www.fypower.org/pdf/CSA_RecycledH20.pdf.

US Geological Survey. 2010. http://water.usgs.gov/watuse/data/2005/index.html

Additional Performance Summary

- Percentage decrease in energy consumption per MG of recycled water: 55%

- Reduction in annual water consumption (MG): 1,968
- Reduction in annual kWh for water consumption (kWh): 27,541

Supporting Measures for Transportation Alternatives and Congestion Management (TACM)

TACM-1. Local Goods

Promote policies, programs, and services that support the local movement of goods in order to reduce the need for travel.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 1,470
- 2025 reductions ($MTCO_2e$): 2,309

Target Indicators

- Divert 10% of local VMT to alternative modes through increased business serving local residents to achieve a 20% reduction in VMT by 2020 and a 30% reduction in VMT by 2025.

Method: Quantifies the benefit of reduced heavy trucking vehicle miles traveled (VMT), based on a case study identifying a relationship between a 10% increase in local production and consumption supporting a 30% reduction in local heavy trucking VMT. Measure quantifies the impact on local trucking VMT using data from EMFAC 2007, which identifies that heavy-duty trucks contribute 20% of VMT in Sacramento County.

Sources

EMFAC 2007.

Leopold Center for Sustainable Agriculture. 2001. Food, Fuel, and Freeways, Table 9 http://www.leopold.iastate.edu/pubs/staff/ppp/food_mil.pdf.

Additional Performance Summary

- Annual VMT attributed to trucking/shipping in Elk Grove in 2020: 18,030,828
- Annual VMT attributed to trucking/shipping in Elk Grove in 2025: 19,860,752

TACM-2. Transit-Oriented Development

Support higher-density, compact development along transit by placing high-density, mixed-use sites near transit opportunities.

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GHG Reductions

- 2020 reductions ($MTCO_2e$): 6,680
- 2025 reductions ($MTCO_2e$): 9,899

Target Indicators

- 36% increase in citywide density by 2020
- 50% increase in citywide density by 2025

Method: The performance of this measure is related to the elasticity of increased density and reduced travel associated with the increased mixture of uses. Case studies support a range of reductions for vehicle miles traveled based on increase in density and increase in convenience to jobs access. CAPCOA identifies a range of VMT reduction potential for increased density of up to 30%. To calculate the net increase in density in the City between 2005 and the target years, calculates the increased density through population and employees per acre, assuming a constrained 5% reduction for citywide VMT due to co-location of homes and other uses for increased density, and a 0.5% reduction in new VMT associated with density for jobs, work commutes, and shopping.

Sources

CAPCOA. 2008. CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas

Emissions from Projects Subject to the California Environmental Quality Act. (Appendix B). Citing TIAX Results of 2005 Literature Search Conducted by TIAX on behalf of SMAQMD.

CAPCOA. 2010. Quantifying Greenhouse Mitigation Measures. A resource for local governments to assess emission reductions from greenhouse gas mitigation measures.

Oak Ridge National Laboratory. 2004. Transportation Energy Book. US Department. of Energy http://cta.ornl.gov/data/index.shtml.

San Joaquin Valley Air Pollution Control District. 2009. Climate Change Action Plan: Addressing Greenhouse Gas Emissions Under the California Environmental Quality Act; Draft Staff Report, June 30, 2009. CCAP Transportation Emission Guidebook.

Additional Performance Summary

2020 Performance:

- Percentage increase density from 2005 (citywide): 35.55%
- Percentage decrease in VMT (citywide) for increased density: 1.78%
- Annual citywide decrease in VMT for increased density: 16,025,220
- Percentage decrease in VMT (citywide) for mixed use and jobs/housing concentration: 0.18%
- Annual decrease in new local shopping and commute VMT for increased mixed use and jobs/housing concentration: 364,243

2035 Performance:

- Percentage increase density from 2005 (citywide): 50.43%
- Percentage decrease in VMT (citywide) for increased density: 2.52%
- Annual citywide decrease in VMT for increased density: 25,038,141
- Percentage decrease in VMT (citywide) for mixed use and jobs/housing concentration: 0.25%
- Annual decrease in new local shopping and commute VMT for increased mixed use and jobs/housing concentration: 511,094

TACM-3. Intracity Transportation Demand Management

The City shall continue to implement strategies and policies that reduce the demand for personal motor vehicle travel for intracity (local) trips.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 20,463
- 2025 reductions ($MTCO_2e$): 21,428

Target Indicators

- Implementation of the City's Transportation Demand Management program to achieve a 30% reduction in local road VMT

Methods: The literature supports a 30% reduction in overall VMT through the implementation of a local transportation demand management (TDM) program. Assumes only VMT on local roads will be affected by the TDM program. Effectiveness of a TDM program will be incremental, with the full VMT reduction potential being reached by 2025.

Source

Victoria Transport Policy Institute. 2010. Transportation Management Programs. http://www.vtpi.org/tdm/tdm42.htm.

Additional Performance Summary

- Percentage reduction in local road VMT: 30%
- Annual local road VMT, 2020: 167,359,976
- Annual local road VMT, 2025: 50,207,993

TACM-4. Intercity Transportation Demand Management

The City shall support and contribute to regional efforts to reduce demand for intercity (regional) personal vehicle travel.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 15,986
- 2025 reductions ($MTCO_2e$): 22,246

Target Indicators

- Implementation of the SACOG Metropolitan Transportation Plan, incldluing light rail, commuter, and other transit programs
- 30% market penetration for commuting and teleconferencing programs

Method: This measure quantifies the GHG reduction benefit of the SACOG Metropolitan Transportation Plan (MTP), which is a 28-year plan for transportation improvements in the six-county region based on projections for growth in population, housing, and jobs. The MTP studies transportation projects connecting Elk Grove and the region such as bus rapid transit lines, increased transit, and rail lines. The MTP estimates that these projects will reduce region-wide VMT by 6% by 2035. This reduction was applied to Elk Grove's 2020 and 2035 VMT as a linear projection. 2010 VMT reflects actual 2005–2009 Sacramento County VMT, which reduced 0.2%. Additionally, the measure quantifies credit for the impact of commuter and flex schedule programs, which are identified as a 2.1% decrease in external telecommuting VMT.

Additional Performance Summary

- Elk Grove business-as-usual VMT (external), 2020: 734,181,432.21
- Elk Grove business-as-usual VMT (external), 2025: 808,692,503.26
- Percentage of external trips for commuting: 70%
- Percentage reduction for workday VMT: 10%
- Market penetration: 30%
- Scaled percentage reduction for VMT due to telecommuting and flex schedules: 2.10%

TACM-5. Pedestrian and Bicycle Travel

Provide for safe and convenient pedestrian and bicycle travel through implementation of the Bicycle and Pedestrian Master Plan and increased bicycle parking standards.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 4,245
- 2025 reductions ($MTCO_2e$): 5,860

Target Indicators

- Pedestrian design to be integrated into new development
- Bicycle parking in all new multi-family and nonresidential development
- Completion of the projects in the Bicycle Plan

Method: Quantifies impact of increased bikeways and residential density, based on case studies demonstrating that each mile of bikeway per 100,000 residents increases bicycle commuting 0.075 percent, all else being equal Assumes the increase in bicycle commuting through the cumulative amount of bike lanes—both new lanes planned for construction and those already existing. The development of bike lanes

will be phased in, with 75% of improvements in the Bicycle Plan completed by 2020 and 100% completed by 2025. 2010 reductions take credit for existing bike lanes, as stated by the Draft Bicycle Plan. Assumes completion of 5.75 miles of Class II bikeways and .79 miles of Class I bikeways to be completed between 2007 and 2010, as identified by Elk Grove's 2007-2012 CIP.

Impact of pedestrian facilities is quantified based on findings of the CCAP guidebook, which attributes emissions reductions for a variety of pedestrian measures. Applicable measures include a 0.5% reduction for connectivity to transit, as the increased density and ridership will facilitate improvement in transit frequency, a 1.5% reduction for measures which relegate parking to the rear of structures so that public entrances are oriented toward the pedestrian, a 0.5% reduction related to providing shaded pedestrian pathways between transit facilities and building entrances to increase the comfort of the user while walking to the building entrance, and a 1% reduction for minimizing barriers to pedestrian access of neighboring facilities and sites. Quantifies impact of pedestrian connectivity between residential and nonresidential land uses, applying the impact to all new VMT.

CAPCOA also demonstrates that the provision of long-term bike parking at the rate of 1 per unit supports a 0.625% reduction in emissions. According to the 2001 National Household Travel Survey, average annual VMT per household is 21,187 and the "to or from work" subcategory is 5,724 (27.0%). Shopping is 3,062 (14.5%). Other family and personal business is 3,956 (18.7%). Social and recreational driving is 5,186 (24.5%). Therefore, VMT is attributed to residents and businesses is 18.7% + 24.5% = 43.5%. VMT attributed to commercial uses is also based on the 2001 National Household Travel Survey, which shows that average annual VMT per household is 21,187 and the "to or from work" subcategory is 5,724 (27.0%). Shopping is 3,062 (14.5%). Other family and personal business is 3,956 (18.7%). Social and recreational driving is 5,186 (24.5%). Therefore, VMT attributed to commercial businesses is 27% + 14.5% = 41.5%.

Sources

CAPCOA. 2008. CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act. (Appendix B). Citing TIAX Results of 2005 Literature Search Conducted by TIAX on behalf of SMAQMD.

City of Elk Grove Capital Investment Program FY 2007–2012.

Dierkers, G., E. Silsbe, S. Stott, S. Winkelman, and M. Wubben. 2007. CCAP Transportation Emissions Guidebook. Washington, DC: Center for Clean Air Policy. http://www.ccap.org/safe/guidebook.php. As cited in CEQA and Climate Change (CAPCOA 2008).

San Joaquin Valley Air Pollution Control District. 2009. Climate Change Action Plan: Addressing Greenhouse Gas Emissions Under the California Environmental Quality Act; Draft Staff Report, June 30, 2009.

Victoria Transportation Planning Institute. 2012. http//www.vtpi.org/tdm/tdm93.htm.

Additional Performance Summary

- Current assumed percentage of bicycle commuters: 2%
- Percentage increase of bicycle commuting: 14%
- Percentage decrease in VMT based on increase in bicycle commuting: 0%
- VMT from new development, 2020: 226,942,525
- VMT from new development, 2025: 318,438,731

- Percentage decrease in VMT for new development from pedestrian connections: 4%
- VMT attributed to new commercial and multi-family development, 2020: 105,264,094
- VMT attributed to new commercial and multi-family development, 2025: 126,750,290
- Percentage decrease in new VMT for commercial and multi-family development for increased bicycle parking: 1%

TACM-6. Public Transit

Continue to improve and expand transit services for commuters and non-commuters traveling within Elk Grove and regionally, providing the opportunity for workers living in other areas of Sacramento County to use all forms of public transit—including bus rapid transit and light rail—to travel to jobs in Elk Grove, as well as for Elk Grove residents to use public transit to commute to jobs outside the City.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 27,053
- 2025 reductions ($MTCO_2e$): 32,040

Target Indicators

- Continued annual increase in e-tran passenger miles at a compound annual growth rate of 23%

Methods: From 2006 to 2008, e-tran saw a 102% increase in passenger miles for its local and commuter lines. Realizing that this growth rate was largely due to economic and service changes, and that transit ridership must taper at some point in time, e-tran passenger miles were projected using 55% of that growth rate per year.

Additional Performance Summary

- e-tran passenger miles, 2006: 3,753,339
- e-tran passenger miles, 2008: 7,599,211
- 55% of compound annual growth rate from 2006 to 2008: 23%

TACM-7. Jobs/Housing Balance

Continue to improve Elk Grove's jobs/housing ratio and seek to achieve sufficient employment opportunities in Elk Grove for all persons living in the City.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 18,655
- 2025 reductions ($MTCO_2e$): 19,718

Target Indicators

- 5% decrease in VMT through increased jobs/housing location efficiency

Methods: Identifies a reduction in trips associated with the increased co-location of housing and jobs within the City. CAPCOA identifies a range of reduction potential for increased density and location efficiency from 65% in urban areas to 10% for suburban areas. This quantification assumes a constrained reduction potential and quantifies a 5% reduction in VMT due to jobs/housing balance achieved through increased location efficiency.

Sources

CAPCOA. 2010. Quantifying Greenhouse Mitigation Measures: A resource for local governments to assess emission reductions from greenhouse gas mitigation measures.

Nelson/Nygaard Consulting Associates. 2005. Creating Low-Traffic Developments: Adjusting Site-Level Vehicle Trip Generation Using URBEMIS.

SMAQMD. 2007. Recommended Guidance for Land Use Emission Reductions, Version 2.4.

URBEMIS 2007. Version 9.2.4. Rimpo and Associates.

Additional Performance Summary

- Percentage decrease in VMT: 5%
- Annual decrease in VMT, 2020: 45,772,231
- Annual decrease in VMT, 2025: 50,889,114

TACM-8. Affordable Housing

Continue to promote and require the development of affordable and senior housing in Elk Grove.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 7,519
- 2025 reductions ($MTCO_2e$): 7,874

Target Indicators

- Approximately 15,000 housing units below market rate by 2020
- Approximately 21,600 homes below market rate by 2025

Methods: CAPCOA provides a 4% reduction in vehicle trips for each deed-restricted below-market-rate unit. Thus, the total reduction is as follows: The 2008 Housing Element Update provides for 2,645 new affordable housing units by 2013. Assuming that these units are operational by 2015, these units will constitute 51% of total new housing units in Elk Grove. Assuming a constant percentage of new units, affordable housing will result in a 2% decrease in VMT (4% * 51%).

Sources

CAPCOA. 2008. CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act (Appendix B MSG-21).

CAPCOA. 2010. Quantifying Greenhouse Mitigation Measures: A resource for local governments to assess emission reductions from greenhouse gas mitigation measures.

Nelson/Nygaard Consulting Associates. 2005. Creating Low-Traffic Developments: Adjusting Site-Level Vehicle Trip Generation Using URBEMIS.

Additional Performance Summary

- New households that are below market rate through Housing Element implementation, 2020: 15,201
- New households that are below market rate through Housing Element implementation, 2025: 21,562
- Percentage decrease in VMT for below-market-rate housing: 2%

TACM-9. Efficient and Alternative Vehicles

Promote alternative fuels and efficient vehicles throughout the community.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 282
- 2025 reductions ($MTCO_2e$): 395

Target Indicators

- 200 electric vehicle charging stations by 2020
- 300 electric charging stations by 2025

Methods: Electric vehicles (EV) are much more efficient than standard internal combustion engine vehicles. The performance of this measure is related to the replacement of standard vehicles with EVs once the necessary infrastructure is available. The literature supports the fuel use reduction equivalent to one 10-mile trip for every charging station available. The energy use needed to service the charging stations was then calculated to discount the emissions reductions. Assumes that stations will be installed through civic and private development at the rate of 20

per year. Identifies estimated VMT associated with parking spaces used for commuting, assuming trip length from the National Household Travel Survey.

Sources

Idaho National Laboratory. 2006. "Full-Size Electric Vehicles." Advanced Vehicle Testing Reports. avt.inel.gov.

National Household Travel Survey. 2001. www.fueleconomy.gov/feg.findacar.html.

Additional Performance Summary

- Average miles per gallon of vehicles replaced with EVs: 20
- Average annual vehicle miles per space: 4,704
- Annual gallons of fuel saved: 47,040
- Average annual kWh of electricity used per space: 11.1

TACM-10. Car Sharing

Promote the use of vehicles and transportation options other than single-occupant vehicles.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 776
- 2025 reductions ($MTCO_2e$): 819

Target Indicators

- 2.5% household participation in car-share programs in 2020 (approximately 1,500 households) and 2025 (approximately 1,600 households)

Methods: Participation in car sharing programs in a typical region is 10–20% of residents living in neighborhoods suitable for car sharing, and perhaps 3–5% of those residents would car share rather than own a private vehicle if the service were available. Car sharing is found to typically be used by residents who drive 6,000 miles a year or less. Reduction is approximately 50%, or 3,000 miles a year. We assume that half of these miles are within the City of Elk Grove. Estimated number of vehicles in Elk Grove calculated by assuming that the number of cars per household is constant with the countywide car per household figure. Car population derived from EMFAC2007, which uses historical DMV registration data. 754,277 cars ÷ 344,129 = 2.19 cars per household, which is in line with the national average.

Sources

EMFAC 2007.

Victoria Transport Policy Institute. 2012. Carsharing. http://www.vtpi.org/tdm/tdm7.htm.

Additional Performance Summary

- Cars per household: 2.19
- Effective rate of participation: 3%
- Annual VMT reduced per car share participant: 1,500

TACM-11. Safe Routes to School

Implement SACOG's Safe Routes to School policy.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 4.9
- 2025 reductions ($MTCO_2e$): 5.1

Target Indicators

- Reduction of 15% of school-related commute trips by 2020 through Safe Routes to School or bus programs

Methods: Quantifies effective impact of a Safe Routes to School program on eliminating drop-off and pick-up school trips. The National Center for Safe Routes to School Baseline Survey indicated that 62% of

elementary and middle school children live within 2 miles of school. Case studies indicate that total reductions in automobile trips of 10–20% or more are possible at a particular school under programs such as a walking school bus. Quantification assumes a 15% reduction in automobile trips, assuming an average round-trip drop-off distance for parents of 3 miles and that the number of school-age children increases evenly with population growth.

Sources

CAPCOA. 2008. CEQA and Climate Change: Evaluating and Addressing Greenhouse Gas Emissions from Projects Subject to the California Environmental Quality Act (Appendix B MSG-2).

National Center for Safe Routes to School. 2010. Safe Routes to School Travel Data: A Look at the Baseline Results from Parent Surveys and Student Travel Tallies.

National Center for Safe Routes to School. n.d. http://www.saferoutesinfo.org/resources/collateral/srts_talkingpoints.doc.

US Census Bureau. http://factfinder.census.gov.

Additional Performance Summary

- Estimated number of students, 2020: 42,704
- Estimated VMT for student commute, 2020: 79,429
- Estimated number of students, 2025: 47,390
- Estimated VMT for student commute, 2025: 88,146

TACM-12. Traffic Calming and Anti-Idling

Improve traffic flow and reduce unnecessary idling through use of traffic calming devices and enforcement of idling restrictions.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 1,853
- 2025 reductions ($MTCO_2e$): 2,255

Target Indicators

- Implement synchronization along major trucking routes to decrease heavy-duty truck idling

Methods: Decrease in trip length from traffic signal synchronization based on a range of 8–25%, assuming the median reduction of 16% supported by the traffic light synchronization project in Los Angeles. Decrease applied to the portion of local trips traveled on arterials. Heavy-duty truck idling derived from EMFAC 2007. Assumes half of all heavy-duty trucks will be targeted by increased enforcement.

Sources

Halkias, J., and M. Schauer. 2004. Public Roads Journal, U.S. DOT. Red Light, Green Light. http://www.itsbenefits.its.dot.gov/its/benecost.nsf/ID/8D5E4B72F890856C8525733A006D547C?OpenDocument&Query=BApp.

Additional Performance Summary

- Percentage of VMT attributed to local roads: 29%
- Average local trip length (miles): 4
- Decrease in trip length from traffic signal synch: 16%
- Hours per year truck idling impacted by measure: 60,000
- Decrease in diesel consumption (gallons): 55,000
- Decrease in gasoline consumption (gallons): 229,901
- Equivalent VMT reduction: 4,546,203

Supporting Measures for Municipal Programs (MP)

MP-1. Employee Commute

Establish an employee incentive program to encourage the use of transportation alternatives.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 14
- 2025 reductions ($MTCO_2e$): 12

Target Indicators

- Provision of a transit subsidy of $2 per day for Elk Grove employees

Methods: Assumes the City of Elk Grove will provide a parking subsidy of $2 per day. According to the Victoria Transport Policy Institute, with a $2 per day parking subsidy in a low-density, travel mode neutral setting, a 3.3% decrease in annual VMT attributed to employee commute is achieved.

Sources

Victoria Transport Policy Institute. 2011. Commuter Financial Incentives. http://www.vtpi.org/tdm/tdm8.htm.

MP-2. Municipal Facilities: New

All City facilities shall incorporate energy-conserving design and construction techniques.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 7
- 2025 reductions ($MTCO_2e$): 7

Target Indicators

- New household hazardous waste facility to supply electricity needs with on-site renewable solar photovoltaics

Methods: Assumes net energy reductions from proposed household hazardous waste facility and renewable energy plant. Estimated energy savings retrieved from City of Elk Grove EECBG grant application (June 2009).

MP-3. Fleet Vehicles

Adopt a policy to incrementally upgrade the vehicle fleet.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 1,865
- 2025 reductions ($MTCO_2e$): 3,231

Target Indicators

- Replace approximately 60 vehicles with electric or hybrid models by 2020
- Replace approximately 86 vehicles with electric or hybrid models by 2025

Methods: This measure quantifies hybrid and electric replacements for 35% of City vehicles by 2020 and 50% by 2025. Police Department vehicles and motorcycles are excluded from this analysis as they are required to maintain pursuit capabilities. The City had 81 vehicles in 2005 in the Public Works Department. Analysis assumes a quarter (20) will be replaced with hybrid vehicles before 2020 and half (40) will be replaced before 2025. Rate of fleet upgrades anticipated to remain constant.

MP-4. Environmentally Preferable Purchasing

Implement a consolidated and comprehensive environmentally preferable purchasing effort.

GHG Reductions

Supportive measure (not quantified)

MP-5. Municipal Facilities: Existing

Implement the recommendations of the City's energy audits.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 127
- 2025 reductions ($MTCO_2e$): 169

Target Indicators

- Retrofits to 75% of City Hall by 2020 and 100% of City Hall by 2025, to achieve an average energy reduction of 20%

Methods: Quantifies impact of comprehensive retrofits to City Hall, based on the recommendations of energy audits. Measure assumes completion of EECBG-funded retrofits, in addition to completion of retrofits to 75% of existing aquare footage by 2020 and completion of 100% of retrofits by 2025. Building retrofits estimated to result in a 20% reduction in energy consumption per square foot.

Sources

California Energy Commission. 2007. Impact Analysis 2008 Update to the California Energy Efficiency Standards for Residential and Nonresidential Buildings.

MP-6. Fleet Operations

Efficiently use and maintain existing vehicles.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 37
- 2025 reductions ($MTCO_2e$): 37

Target Indicators

- Creation of a municipal maintenance program to enhance efficiency of all City vehicles

Methods: Assumes a 0.5% decrease in emissions from proper maintenance of vehicles and equipment.

Source

US Environmental Protection Agency. 2009. EPA Potential for Reducing Greenhouse Gas Emissions in the Construction Sector.

MP-7. Municipal Water Use

Improve the efficiency of municipal water use through retrofits and employee education.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 0.05
- 2025 reductions ($MTCO_2e$): 0.04

Target Indicators

- Installation of energy-efficient sprinklers and irrigation systems

Methods: Assumes proportion of total emissions associated with water use in municipal operations is equal to the proportion of water use community-wide (0.6%). The percentage of municipal energy consumption for water is based on baseline data in the 2005 GHG inventory. It was assumed that the proportion of municipal energy use for municipal sprinklers, irrigation, and pumps compared to total municipal energy use in 2005 would remain constant in the target years. Quantifies impact of a 1.8% reduction to projected energy consumption for municipal water use for municipal sprinklers, irrigation, and pumps, based on co-investment by utilities for municipal water efficiency consistent with estimates for water efficiency potential from the CEC.

Sources

California Energy Commission. 2005. Final Staff Report: California's Water-Energy Relationship, pp. 154–155. http://www.energy.ca.gov /2005publications/CEC-700-2005-011/CEC-700-2005-

011-SF.PDF. Citing "Waste Not, Want Not: The Potential for Urban Water Conservation in California," The Pacific Institute, November 2003.

City of Novato. 2005. Greenhouse Gas Inventory.

MP-8. Municipal Waste

Reduce municipal waste through employee education and environmentally preferable purchasing.

GHG Reductions

- 2020 reductions ($MTCO_2e$): 100
- 2025 reductions ($MTCO_2e$): 147

Target Indicators

- Achieve an 80% municipal solid waste diversion rate by 2020
- Achieve a 90% municipal solid waste diversion rate by 2025

Methods: Assumes 2010 municipal solid waste diversion rate is consistent with community-wide solid waste diversion rate. Quantifies impact of achieving 80% diversion by 2020 and 90% by 2025.